SEALED WITH A KISS:

HEAD-TURNING ASYMMETRIES DURING KISSING ARE MODULATED BY CONTEXT AND INFLUENCE PERCEPTUAL JUDGEMENTS

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ABSTRACT

When leaning forward to kiss a romantic partner, individuals tend to direct their kiss to the right more often than to the left. The theoretical mechanism guiding this asymmetry is that it originates from a right head-turning preference observed within early stages of human development. By contrast, other lateral turning biases are theorized to stem from differences of hemispheric specialization of emotion rather than from an innate influence, to which the lateral direction of these biases are dependent on their situational context. My first two studies examine if the context for non-romantic conventions of lip-kissing convey a comparable right-turn bias, as the existing literature has focused on romantic-kissing gestures. If kissing laterality is caused from an innately guided right head-turning bias, this directionality should transcend different forms of kissing. Study 1 analysed the turning directions of kisses from videos from the *First Kiss* social media trend, featuring strangers performing a lip-to-lip kiss. The predominant right-turn bias was not supported; rather, no significant directional bias was observed. To further explore the role of a non-romantic kissing context, study 2 introduced the type of kiss shared between a parent and child. Images of parent-parent kissing (romantic context) and parent-child kissing (parental context) couples were collected for an archival analysis. A right-turn kissing bias was revealed, but only for the romantic kissing couples; for parental kisses, a leftward bias was found. Collectively, the first two studies do not coincide with the congenital account of kissing laterality, as attenuated and reversed turning biases were found.

For study 3, romantic and parental kissing were further investigated while also exploring if perceptual input of kissing biases corresponds to the direction of motor output. Studies 3a and 3b employed a forced-choice task in which image-pairs of romantic and parental kissing couples were presented and asked which image was perceived as more “passionate” and “loving”, respectively. Kisses between romantic couples were perceived to be more passionate when

displaying a right turn in comparison to a left turn, whereas images with neither left nor right turns were perceived to be more loving for parent-child kissing couples. The final study examines how cognitive evaluations unrelated to the kiss are influenced in the field of advertising. Original and mirror-reversed versions of advertisements with models kissing were displayed in a forced-choice preference task and consumer-judgement task. Models illustrating a right turn (vs left turn) when kissing were preferred when identical images were presented. When ads were presented individually, right-turn (vs left-turn) kisses resulted in higher consumer attitudes and purchase intention.

This body of research challenges the previous rationale that kissing laterality persists from the right head-turning preference observed in infancy, as contexts with parental and strangers kissing reveal a leftward preference or no directional bias. Our findings also contribute to our understanding of how kissing biases are exhibited within earlier stages of cognitive processing, such that perceptions of passion and consumer preferences for visual stimuli displaying romantic kissing corresponds to the direction of authentic turning behaviour: the right. Further discussion speculates on how cerebral lateralization of emotions may contribute to kissing laterality, to which a variety of future directions are suggested to test these predictions.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Number Page Number

LIST OF APPENDICES

“Is this a kissing book?”

-The Princess Bride, 1987

CHAPTER 1

AN INTRODUCTION TO TURNING ASYMMETRIES

From throwing a ball to turning to pose for a picture, humans exhibit various population-level behaviours performed more frequently to the left or right. Asymmetries that are most consciously acknowledged are respective to our own bodies, such as which hand feels most natural to write with or which leg we depend on for balance. A less salient but equally persistent rightwards motor bias has been identified in head-turning behaviour.

A rightward head-turning bias is frequently reported from the direction that newborns tend to position their head when lying down (i.e., supine posture; Cioni & Pellegrinetti, 1982; Konishi, Mikawa, & Suzuki, 1986; Risser et al., 1985; Ververs, de Vries, van Geijn, & Hopkins, 1994) and from adults' slight deviation of their center of gravity (Cernacek & Jagr, 1972b; Niederlandova & Litvinenkova, 1973); when comparing across studies, approximately 72% of infants and 63% of adults demonstrate this right-side directionality. Previc's (1991) distinguished theory of cerebral lateralization is the common explanation of head-turning bias, citing that this behaviour is linked to neurodevelopmental asymmetries from the prenatal environment. In the third trimester of pregnancy, the left side of the foetus is predominantly oriented towards the inside of the mother's womb (Churchill et al., 1962; Dubois, 1833; Pinard, 1878; Williams, 1926), thus exposing the right-side of the foetus' body to the exterior. Consequently, the locomotion of normal maternal walking would be accelerated rightward, and its inertial force guided leftward. A left-otolithic asymmetry is suggested to arise from the inertial force providing more stimulation to the left utricle in comparison to the right. The utricle is an organ located in the inner ear and contributes to our vestibular system; thus, favoured stimulation of the left utricle would promote a vestibular and head-turning motor bias to the right side of space.

Previc's (1991) theory of infant head turning and adult-vestibular motor dominance is characterized as an innate-motoric asymmetry, akin to handedness or footedness. Given its biological nature, this theory should predict that other head-turning biases would similarly be oriented to the right, particularly because rates of other lateral preferences (i.e., right-handedness) generally transcend across cultures (Ardila et al., 1989), time periods (Dragovic, 2004; Gilbert & Wysocki, 1992), and contexts. Specifically, with regards to context, this implies that individuals who use their right hand to write with a pen will typically use the same hand to manipulate a paintbrush. However, since the conception of Previc's (1991) theory, other turning biases have been discovered that reflect differences of hemispheric processing rather than from a congenital cause.

Turning behaviours of individuals entering a symmetrical theatre depend on the purpose and motivation of the presentation. When examining real-world seating biases of moviegoers, individuals display a right-side seating bias (Harms, Reese, & Elias, 2014); however, participants instructed to choose a seat on a movie-seating chart when informed that they are unmotivated to view the film, the rightward bias disappears (Okubo, 2010). Alternatively, when observing students' seating choices in a lecture-hall environment, the direction of seating preferences is reversed, as a left-side bias is exhibited (Harms, Poon, Smith, & Elias, 2015). Similarly, lateral head turning in portrait posing differs by the context in which it is framed. Participants asked by Nicholls et al. (1999) to portray as much emotion as possible offer the left cheek (i.e., a right head turn), but when instructed to withhold emotion, a left-turn, right-cheek bias is presented. The theoretical mechanisms guiding the aforementioned turning biases differ, but collectively, they are speculated to originate from functional differences between cerebral hemispheres.

In 2003, an asymmetrical turning bias was reported during osculation, the scientific term for kissing, but was suggested to originate from the congenital account guided from Previc's

(1991) prenatal theory of cerebral lateralization (Güntürkün, 2003). This turning bias has received considerably little empirical attention in comparison to seating or posing asymmetries, thereby warranting further exploration considering its purpose within various human interactions; kisses are shared between friends to communicate salutations, from lovers to convey passion, and, amongst others, for parents to exude nurturance. In this series of studies, I will challenge the congenital theory of kissing laterality and broaden the scope to investigate how motor actions correspond to perceptual evaluations of lateral turning behaviour when kissing.

Kissing Right: Directional Head-turning Bias During Kissing

Head-turning asymmetries during kissing were initially reported in *Nature* with research conducted by Onur Güntürkün (2003). From naturalistically observing adult-kissing behaviour, 124 lip-to-lip kisses were surveyed in public spaces (e.g., airport terminals, parks) in the United States, Germany, and Turkey. Curiously, a disproportionate number of partners turned to the right when leaning in for a kiss; approximately 65% exhibited the right head turn, whereas 35% turned left.

Because only two-thirds of the couples Güntürkün (2003) observed displayed a right head turn, one would expect that some individuals genuinely held an opposite leftward preference. Considering this predicament, the researcher emphasized that head-turning preferences could not generalize to individual biases, as nonverbal cues could be elicited from kisser A to subtly signal kisser B with the direction of turn. Assumingly, this guidance would be reciprocated by the other partner, as the options are to awkwardly seesaw heads until the direction of head turns coincide or to engage in a cranial collision. Although almost impossible for an observer to distinguish between the leader and the follower, several studies have eliminated the element of joint action by introducing a less realistic and more eccentric kissing partner: an adult-sized mannequin head

(Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011).

Analysing asymmetries in a doll-kissing paradigm eliminated two potential confounds: 1) Non-verbal prompts facilitated by a human partner, and 2) the emotional motivation to deliver a quality kiss. As a result, the direction of bias would reflect an individual's own turning preference. For the mannequin-kissing task, the plastic partner was vertically positioned to the height of the participant (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011). Independent of the partner's influence, the participant's right-turn bias not only persisted, but also was in some cases pronounced; rightward turns ranged from 62% (Ocklenburg & Güntürkün, 2009) to 80% (Barrett, Greenwood, & McCullagh, 2006) of doll-kisses. Interestingly, when the doll's orientation was incompatible for right-turners (i.e., turned to the *kisser's* right, therefore the dummy's left), this group was rigid with their turning bias, as they simply overcompensated their head turn to plant a kiss toward their preferred side (van der Kamp & Canal-Bruland, 2011).

Proposed Mechanisms of Kissing Asymmetries

Kissing Right: A Product of an Innate Motor Bias?

Güntürkün's (2003) predictions for kissing laterality were conceptualized from a right head-turning preference observed within early stages of human development. Beginning from 38 weeks of gestation, fetal head position favours a right-side turn (Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994) based on how the foetus tends to rest in the mother's womb (Previc, 1991; Rönnqvist & Hopkins, 1998). Postpartum, the rightward head-turn is demonstrated from infant's supine posture until approximately 3 months of age or until the ability to support a mid-line posture is achieved (Coryell & Michel, 1978; Hopkins, Lems, Janssen, & Butterworth, 1987).

Accounts of the right head-turn *in utero* implied that head-turning is a product of lateral motor dominance, as hand preferences (i.e., thumb-sucking) are similarly observed prenatally and found to predict future reports of handedness (Hepper, Wells, & Lynch, 2005). Further, the direction of supine posture preference is additionally found to correspond to hand preference after the age of 2 (Michel, 1981), thus providing supplemental evidence for the congenital theory of kissing laterality. Because head-turning preferences are less apparent in comparison to handedness, likely due to its lower functional utility, it is defined as a transient bias. It is one of humans' first-observed motor asymmetries, the bias disappears, but is later revealed during kissing behaviour (Güntürkün, 2003).

Based on the consistency of the right-turn preference, the prediction that kissing laterality stems from a head-turning motor bias is a logical assumption. Rightward preferences of foot and eye dominance convey a similar 2:1 ratio (Nachshon, Denno, & Aurand, 1983) which is a comparable proportion to right head turns observed from individuals' kissing preferences in the mannequin-kissing task (Barrett et al., 2006; Ocklenburg & Güntürkün, 2009). However, the joint pattern between head-turning when kissing and corresponding motor biases are mixed. Ocklenburg and Güntürkün (2009) reported a significant relationship of turning bias for doll kisses to handedness and footedness; however, van der Kamp and Canal-Bruland (2011), Barrett et al. (2006), and Shaki (2013) found no correlations between turning preference respective to handedness, footedness, or eyedness. Nonetheless, a consistent pattern of sidedness is exhibited between the preceding motor biases (Kumar, Misra, Suman, Suar., & Mandal, 2010; Mandal, Pandey, Singh, & Asthana, 1992).

These findings suggest a disconnect between the rightward pattern of turning preferences and other lateral asymmetries. However, the most recent study challenges the theory of kissing

arising from innate influences, as factors known to modulate lateral visuospatial biases are similarly evidenced with respect to turning preference.

Is Kissing Right, Kissing Right? Modulating Factor of Turning Bias.

An exploratory study conducted by Shaki (2013) questioned if native reading direction influenced the direction of kissing asymmetry, as other lateral biases related to visuospatial attention are often influenced by the orthography of the language that one learns to read and write (e.g., aesthetic composition preferences; Chokron & De Agostini, 2000; Friedrich, Harms, & Elias, 2013; Nachson, Argaman, & Luria, 1999; Pérez González, 2012). A replication of the naturalistic observation and doll-kissing tasks were administered in regions with predominantly left-to-right (LTR; Italian, Russian, English) and right-to-left (RTL; Hebrew, Arabic) reading languages. Turning biases diverged depending on the culture's reading habits; during naturalistic kisses, Western couples exhibited the consistent right-turn kiss (67.6%), whereas Middle Eastern couples displayed a *left*-turn bias (77.9%), and this disparity was mirrored in the doll-task, as 65.7% right and 67.5% left turns were respectively demonstrated by Western and Middle Eastern participants. This is parallel to Güntürkün's (2003) naturalistic study, as data collection was chiefly from countries with official languages that read from LTR. Shaki's (2013) interpretation for the contrasting biases suggests that when fixating on a partner's face, LTR readers would visually scan rightward, thus following the direction of turn consistent with their scan-path when reading. For the same reasons, RTL readers would display an opposite bias.

If kissing laterality were in fact the result of a biologically-driven motor bias, we should expect that the magnitude of the right-side bias transcends cross-culturally, comparable to preferences like handedness (see Raymond & Pontier, 2004 for review). However, the findings presented by Shaki (2013) question this assumption, as Western and Middle Eastern cultures displayed opposite biases. In respect to turning direction when kissing, the only difference is the

orthography of each culture's official language. In light of this discovery, I speculate that other unexplored factors may influence the strength or directionality of turning orientation. For instance, when considering turning asymmetries for seating (Harms et al., 2015; Harms, Reese, & Elias, 2014; Weyers, Milnik, Müller, & Pauli, 2006) or posing (Lindell & Savill, 2010; Nicholls, Clode, Lindell & Wood, 2002), the direction of bias depends on the context that behaviour is in. With respect to the current literature on lip-kissing biases, however, only kisses shared between adult partners have been examined. Furthermore, this context is presumably a romantically-motivated one, as kissing on the lips between adults is traditionally between amorous partners rather than as a social greeting. Additional inquiry is warranted to explore kisses motivated in a non-romantic context.

First-kiss Encounters: Exploring Potential Modulating Variable of Kissing Context

The introduction of a different type of kiss offers a broader frontier in kissing laterality research. Indeed, humans have several conventions of kissing, such as when greeting friends, within religious rituals, or when displaying affection. When strictly considering lip-kisses, even these differ with intention. For romantic contexts, delivering an exceptional kiss is reportedly significant in the early stages of a relationship (Hughes, Harrison, & Gallup Jr, 2007) and throughout long-term relationships (Wlodarski & Dunbar, 2015). The objective to deliver a first kiss is of particular importance in a romantic context, as conveyed by reports of American college students; two-thirds of women and men disclosed that they experienced less attraction to a partner of interest following an initial kiss (Hughes et al., 2007). There is currently no research to support that the same standard is upheld for other types of kissing, such as a kiss between friends or of a parent kissing their child, though we expect that it is not controversial to state that the pleasurable aspects of romantic kisses are unexpected for other conventions of kissing.

An interesting avenue of study would be to examine a kiss that is physically comparable to that of previous study, namely, a lip-to-lip kiss shared between adults, but alternatively, from a context where the individuals do not have any incentive to perform a quality kiss. Specifically, what turning direction would people make when asking two *strangers* to perform a single lip kiss? Strangers kissing simultaneously allows for observing how individuals with no prior kissing interactions engage with another to arrive at a common turning direction.

The feasibility of observing strangers kissing was made possible from a stream of *First Kiss* videos emerging on social media platforms since 2014. Featured in each video are a series of kisses between unacquainted individuals facilitated by the film's directors. By analyzing the context of these videos, we predict that when leaning in for a kiss, couples will turn to the right more often than to the left. This directionality is grounded by the predominant theory that right orientations of head-turning are facilitated by a congenital mechanism acquired from the prenatal environment, as posited by the extant literature on kissing laterality. We should further expect a right-turn bias because the videos were filmed in geographic locations from LTR reading populations. Specifically, my overarching research question for study 1 is the following:

1) Provided with the opportunity to examine kissing between consenting strangers, does the right-turn bias observed between romantic couples persist?

CHAPTER 2

FIRST KISS LATERALITY EDITION: ABSENCE OF DIRECTIONAL TURING BIAS DURING FIRST KISS ENCOUNTERS

Humans exhibit various behavioural asymmetries. Some of these asymmetries are easily detected, such as which hand we prefer to write with, but other asymmetries are less intuitive. To illustrate, consider the following: When leaning in to kiss a romantic partner, do you prefer to turn your head left or right? Our head-turning preference when kissing is rarely considered, as this decision tends to be automatic and coordinated with the partner's turning direction. Investigations of kissing behaviour using naturalistic observation (Güntürkün, 2003; Ocklenburg & Güntürkün, 2009; Shaki, 2013) and experimental paradigms (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011) have determined that humans from Western cultures exhibit a preferential turning orientation. The direction of head-turn when planting a kiss is known as turning bias and is a relatively unexplored area of laterality research.

Head-turning biases during kissing were discovered by Güntürkün (2003) who observed 124 naturalistic lip-to-lip kisses from couples in public spaces (e.g., airport terminals, parks) in the United States, Germany, and Turkey. Through these observations, Güntürkün identified that a disproportionate number of couples turned to the right to kiss; approximately 65% performed right head turns, whereas 35% turned left. However, as affirmed by the researcher himself, this directional bias cannot generalize to individual turning preferences, as subtle physical cues could have been shared between partners to facilitate the joint goal of turning in the same direction. Because only 65% of kisses observed were right turns, it would be expected that some individuals possessed an opposite turning preference. The non-verbal signal of one partner would thus facilitate the direction of turn, and the other partner would mirror this action to avoid either

nose-bumping or awkward hesitation, resulting in a “never-ending dance of thrust and withdraw” (Rankin, 2014).

To rectify the previous shortcoming, further studies introduced a neutral kissing partner, a mannequin head, thereby eliminating any gestural prompts of head-turning or emotional influence toward the partner (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011). This lab-based paradigm indicated that the turning direction of individual persons kissing displayed the same pronounced rightward bias, ranging from 62% (Ocklenburg & Güntürkün, 2009) to 80% (Barrett, Greenwood, & McCullagh, 2006) across doll-kissing experiments.

Güntürkün’s (2003) rationale for the reliable right-turn bias is that it originates from a right head-turning preference identified in early stages of human development. Beginning from 38 weeks of gestation, fetal head position favours a right-side turn (Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994) based on how the foetus tends to rest in the mother’s womb (Previc, 1991; Rönnqvist & Hopkins, 1998). After birth, the rightwards head-turn is demonstrated from infant’s supine posture until the age of 3 months or until able to support a mid-line posture (Coryell & Michel, 1978; Hopkins, Lems, Janssen, & Butterworth, 1987). Head-turning asymmetries are thus described to be transient. They are one of our first observable motor preferences and disappear from typical developmental progress, but they are prominently displayed when leaning forward for a kiss (Güntürkün, 2003). This congenital hypothesis has been the predominant theory guiding kissing laterality, though recent investigation regarding other factors challenge this theory.

Exploratory research by Shaki (2013) studied if native reading direction, a variable known to attenuate or sometimes reverse the directional bias of visuospatial asymmetries (e.g., aesthetic preferences; Chokron & De Agostini, 2000; Friedrich, Harms, & Elias, 2013; Nachson, Argaman,

& Luria, 1999; Pérez González, 2012), correspondingly affected head-turning preference. Replications of the naturalistic observation and mannequin-kissing studies were implemented in countries with official languages that read from left-to-right (Italy, Canada) and right-to-left (Israel, Palestine); the rightward bias elicited from prior studies were from regions with predominantly left-to-right reading languages. If head-turning was due to an innate motor bias, a comparable rightward preference would be expected, as other right-side motor preferences tend to persist cross-culturally (i.e., handedness; Dragovic, 2004; Gilbert & Wysocki, 1992). However, a reversed bias was evident from both authentic and doll-kissing behaviour: Left-to-right readers displayed a right-turn bias, whereas right-to-left readers displayed a *left*-turn bias. This study was the first to question the theory that head-turning was guided by an innate mechanism and also to demonstrate that kissing laterality may be modulated by additional influences.

Respective to the presented literature, the right head-turn bias within Western cultures is consistently observed for interactions of *romantic* kissing (Güntürkün, 2003; Shaki, 2013). One characteristic of romantic kissing is the intention to deliver a kiss that will be perceived by the partner to be of exceptional quality. The importance of the frequency and quality of a kiss is deemed to be significant as reported from couples in both early relationship stages and long-term romantic relationships (Hughes, Harrison, & Gallup Jr, 2007). A *first* kiss is particularly noteworthy; American college students surveyed by Hughes et al. (2007) disclosed that appraisals of first kisses for women contribute to mate attraction, and two-thirds of both men and women experienced a decrease in attraction to a partner of interest after an initial kiss. Yet, humans possess various kissing conventions between *non*-romantic partners. For instance, some cultures perform kissing as a social gesture, which is shared with any number of people, including strangers, as an amicable habit of greeting. This differs from a romantically-motivated

kiss with one key aspect being the incentive to present a quality kiss. There is currently no research to suggest that social kisses are held to the same standard of quality or elicit comparable gratification, though we can predict that it is non-controversial that the motivations and consequences of romantic kisses are not expected for social ones.

An additional difference to note from the extant kissing bias literature is that the kisses are shared between people who predictably know each other, and through experience, could intuitively establish a common turning direction when kissing. Our area of interest is to examine the direction that adult couples turn to kiss upon their *first* kissing encounter, notably between individuals who have no prior kissing interactions. Specifically, what turning direction would be facilitated for a first kiss when asking two *strangers* to perform a lip-to-lip kiss? The possibility of analyzing this unique kissing context was feasible due to a succession of online videos stemming from one social experiment.

In March 2014, New York clothing company Wren released a short film entitled *First Kiss*. Directed by Tatia Pllieva, *First Kiss* displays 20 unacquainted individuals who have consented to be randomly paired with each other to engage in a first kiss. The initiation of each kiss is captured, thus illustrating precisely the direction that individuals turn when approaching their partner. As one would imagine when kissing a stranger, the body language revealed is often awkward, though surprisingly, for some couples, intensely passionate (see Figure 1). Before this study, 23 first kiss videos were available on the popular online video source, YouTube. Although we are trusting that these kisses are in fact between strangers, the opportunity to examine first kiss encounters has become a possibility because of this unique data driven by social media.

Figure 2-1. Film stills from *First Kiss*. As conveyed by the body language, the images from left to right illustrate a passionate and awkward kissing interaction, respectively.

The *First Kiss* videos comprise the content of our analysis, to which the purpose of exploring this content is to study the lateral turning direction during couples' first kissing encounters. This scenario is shared between adult couples, parallel to the kissing dyads from previous research**,** though from a context beyond a typical social or romantic one: a mouth kiss between strangers. When leaning in for the kiss, we predict that couples will turn to the right more often than to the left. This directionality is grounded from the predominant theory that right orientations are facilitated by an innately guided head-turning motor bias. Further, we should expect a right-turn bias to emerge because the geographic location in which the videos were filmed are from LTR reading populations. The current study will indicate how the nonverbal interaction of kissing behaviour is directed for a non-romantic context and with no prior experience**.**

Materials and Method

The turning direction from 230 kissing couples were coded from 23 videos on the video-sharing website, YouTube. Videos were found by searching the original *First Kiss* filmed by Tatia Pilieva, and the proceeding videos were provided by YouTube's search results, featuring other "First Kiss" videos (see Appendix 2.1 for list of videos). The initiation of the kiss was the

point of interest for coding the turning direction; therefore, longer kisses that varied in turning direction were only counted once, and that was at the first point of lip contact. The variables coded were the turning direction of the kiss (left = -1, center = 0, right = 1, and 2 = ambiguous) and kissing partners (man-woman, man-man, woman-woman; see Table 2.1 for kissing partner information). Four images were ambiguous and excluded from analysis. Coding was completed on all the First Kiss videos that were presently available.

Table 2-1. *First Kiss Turning-Bias Frequencies*

Kissing Group	*N*	Left/Central/Right Turns
Man-Woman	187	86/2/99
Man-Man	17	11/0/6
Woman-Woman	22	12/0/10
Total	226	

Inter-coder Reliability

Turning direction in all the videos were coded by the primary researcher and an independent coder. Screen captures from each video were compiled to ensure that coders' responses were toward the same couple and to identify any duplicate footage of the couples, as they were often featured more than once per video. Coding disagreements were only found when one coder perceived a lateral turning direction and the other could not identify the direction (i.e., an ambiguous turn); ambiguous kissing directions were excluded from data analysis. A Cohen's Kappa was conducted and revealed that turning direction was in high agreement between coders, $\kappa = .96$, (95% CI, .944 to .983), $p < .001$.

Results

To examine if the directionality of left (-1) from right (+1) turns differed significantly

from a central kissing presentation (0), a one-sample *t*-test was computed with a mid-point of zero reflecting a central kiss (i.e., no turning bias). The results of the one-sample *t*-test revealed that the mean turning bias of strangers kissing (M =.03, SD =.1) did not differ significantly from zero, $t(226) = .4$, p =.689, indicating that no significant turning bias was present. Because there was a relatively equal number of right (50.9%) and left (48.2%) turns rather than central ones (.09%), the non-significant difference from zero was due to a lack of unidirectional bias displayed by the couples from the First Kiss videos.

Discussion

The current study examined the kissing orientation of strangers in videos from the *First Kiss* social media trend. When leaning in to kiss a stranger, we predicted that couples would display a right-turn bias, consistent to the turning direction of lip-kissing from romantic couples in Western cultures (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; Ocklenburg & Güntürkün, 2009; Shaki, 2013; van der Kamp & Canal-Bruland, 2011). This prediction was guided by the previous literature which posited that the right head turn exhibited from kissing behaviour results from a corresponding motor bias observed as early as 38-weeks of gestation (Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994). Our results revealed that no significant directional bias was found, as the amount of left and right turns were nearly equal across kissing couples. The findings from our novel scenario contrast the persistent right-turn bias, thus disputing the predominant theory that head-turning from kissing behaviour results from an innately determined motor preference.

An important aspect to note is that the lack of bias observed during strangers kissing was revealed using kissing criteria parallel to that of previous research. These qualifications included lip contact, face-to-face positioning, and the absence of hand-held objects (Güntürkün, 2003; Shaki, 2013). Although our observations were from existing media rather than naturalistic

environments, the only difference that is relevant to turning bias is the situational context. Therefore, we can justly conclude that the attenuated turning asymmetry for strangers kissing depended on the type of the kiss.

Kissing a romantic partner differs in its purpose and motivations in comparison to kissing a stranger. The romantic kiss is defined by its relational and sexual motives (Moore, Kulibert, & Thompson, 2017), and its quality and frequency in established relationships is positively associated with partner satisfaction (Wlodarski & Dunbar, 2015). The significance of giving a physically pleasurable kiss is perhaps consciously understood, evident from the volume of online content dedicated to informing viewers and readers on how to give the "ultimate" kiss. Romantic kisses also offer a type of intimacy unparalleled to kissing an unacquainted individual. Interestingly, sex workers refuse to kiss clients under the notion that kisses are deemed to be "too intimate" (Brewis & Linstead, 2000) to conduct with a stranger. This rejection is echoed from the requests of male clients; from 1,230 encounters observed, only 13% asked to French kiss (Stein, 1974). Overall, romantic kissing is incomparably motivated by emotions that express intimacy, physical pleasure, and passion.

Conceivably, kisses between strangers from the First Kiss videos did not share these same elements. Although participation was consensual, the motivation to deliver or the expectation to receive a passionate kiss was predictably lower than that of a romantic one, and likely an uncomfortable experience considering that most kisses were filmed in North American cities that do not conduct even social forms of kissing. By acknowledging the utility and motivational differences between romantic and non-romantic conventions of kissing, we speculate that the lack of bias resulted from the decreased initiative to deliver a pleasurable kiss. With respect to other behavioural asymmetries, such as seating and posing biases, the type of affective motivation can influence the directionality of bias.

Turning behaviours of individuals entering a symmetrical theatre are found to depend on the purpose and motivation of the presentation. When examining real-world seating biases of movie-goers, individuals display a right-side bias (Harms, Reese, & Elias, 2014); however, when participants are told they are negatively motivated to view the film, the right-directional bias disappears (Okubo, 2010). Lateral head-turning in picture posing similarly differs by the context in which it is framed. Participants asked by Nicholls et al. (1999) to portray as much emotion as possible offered the left cheek (i.e., a right head-turn), but when instructed to withhold emotion, a left-turn, right-cheek bias was presented. Interestingly, the theory grounding these turning biases are not guided by a congenital mechanism, but are speculated to arise from functional differences between cerebral hemispheres. Given the attenuated bias when presenting a novel kissing context in the current study, we speculate that kissing laterality is similarly guided by hemispheric asymmetries. The following section provides a speculative account for the rightward direction of romantic kissing and attenuated bias for strangers kissing.

Hemispheric Lateralization of Emotion Processing

The approach-withdrawal model of emotional lateralization operates under the premise that functional differences between cerebral hemispheres guide the direction of behavioural asymmetries. According to this model of emotional lateralization, emotions such as happiness and anger are associated with approach-motivation, best characterized as goal-oriented, reward-driven behaviour (Davidson & Irwin, 1999b). Approach-oriented behaviours are neurologically found to correspond with left-hemisphere activation; when positive affect is promoted, a relative increase in the left prefrontal cortex is exhibited (Harmon-Jones & Allen, 1998; Tomarken, Davidson, Wheeler, & Doss, 1992), thus increasing attention to the contralateral right visual-field. Alternatively, the withdrawal system is specialized for most negative emotions (i.e., disgust, fear) to which the behaviour is goal-aversive. Contrasting approach-motivation, the

withdrawal system is associated with right-hemisphere specialization (Davidson, Ekman, Saron, Senulis, & Friesen, 1990), thus facilitating an opposite leftward bias.

Rightward biases arising from approach-related contexts are demonstrated from various visuospatial behaviours. During line-bisection tasks, a common measure of assessing lateral visuospatial bias (Bowers & Heilman, 1980; Jewell & McCourt, 2000), individuals provided with a positive outcome (approach-motivation) bisect lines significantly farther to the right than individuals assigned to a negative outcome (withdrawal-motivation) group (Friedman & Förster, 2005; Nash, Mcgregor, & Inzlicht, 2010). A content analysis by Roskes et al. (2011) also examined lateral biases from video footage by observing goaltenders' behaviours during Fédération Internationale de Football Association (FIFA) World Cup penalty shoot-outs. Although the lateral direction of penalty kicks were equal, goalies were twice as likely to dive right rather than left when their team's score was behind (theorized as approach-motivated), whereas no directional bias was found when the team was ahead or if the score was equal. Due to the increased motivation to win, the researchers speculate visual attention was disproportionately oriented rightward, to which this directionality of action followed.

Arising from this model of emotional laterality, we speculate that romantic kisses correspond with approach-motivated behaviour, thus facilitating more right-turns from the left hemisphere's goal-oriented emotional function. Strangers kissing creates a unique condition, in which individuals have assumingly lower motivation than romantic kissers to provide a quality kiss, and this condition perhaps shifts the direction of bias due to withdrawal or decreases approach motivation. Further reasoning comes from the observation that couples from the First Kiss videos were predominantly from North American cities that do not embody social norms of kissing, also contributing to more left, avoidance-related behaviour.

Limitations and Future Directions

Because of the ethical constraints of asking unacquainted participants to kiss, our research method to address first kisses was our only conceivable option and was circumstantial because of the First Kiss video phenomenon. Limitations of our design comes from the nature of using a content analysis, from which we do not have access to fruitful information from the participants. For example, asking participants to rate their feelings prior to meeting their kissing partner, their attraction toward the stranger, and their quality of the kiss could illuminate approach versus withdrawal emotions linked to the kiss's turning direction. We could possibly make these assumptions from the duration that couples kissed, though each video pans from the initiation of each kiss to feature other couples. Thus, the video editing obscures the kiss's duration.

An alternate possibility to understand if affective motivations led to an attenuated right-turn bias arises observations from the couples in the First Kiss videos. Throughout the videos, the body language and perceived passion or awkwardness of the kisses were visible across participating couples. To assign which category each kissing couple is designated (passionate, neutral, or awkward), independent raters could evaluate the degree of passion exhibited by the kissers, to which the lateral turning direction of each group would be analysed. If romantic contexts of kisses conduct right-turn biases, we should expect this to correspond to the most passionately rated kissers; for awkward kissers, we predict there to be an attenuated direction of bias.

Prior to the following conclusions, one conflicting observation must be addressed: When provided with the neutral kissing partner, the life-sized mannequin, what explains the right-turn bias? Barrett et al. (2006) concedes that the doll represented a non-emotional, neutral context. When leaning in for a kiss, a right-turn preference would suggest support for the congenital theory of kissing bias, as preference would be independent of human partners. We propose an

explanation. One consideration is that the mannequin does not introduce a *different* context of kissing, but rather, it provides *no* context. In the absence of context, however, individuals continue to exhibit lateral biases unattributed to innate motor preferences. When asked to pose for a portrait with context (e.g., to convey as much emotion as possible; Nicholls et al., 1999) or when posing for a picture without context (Nicholls, Wolfgang, Clode, & Lindell, 2002), individuals present a left-cheek bias. Considering that doll-kissing study participants were recruited from an undergraduate sample, their cognitive schema for kissing conceivably is toward a romantic partner. Further, due to the size and corresponding height of the mannequin head, this could effectively prime participants to imagine how they would facilitate a kiss with a romantic partner. To investigate contextual differences, vignettes describing either a social or romantic scenario could be provided with a mannequin-kissing task. Using vignettes to frame a behaviour's context has been used to examine lateral biases that have been more thoroughly investigated (e.g., posing, seating; Nicholls et al., 1999; Okubo, 2010).

In conclusion, the present study provides insight on kissing behaviours from a novel perspective: a first kiss shared between strangers. Our research demonstrates that the right-turn bias reliably exhibited between Western couples is not facilitated in first-time kissing encounters between non-romantic partners, as no significant directional bias was found. This directionality may be guided by hemispheric differences associated with motivation, as choosing strangers to kiss from the First Kiss videos from our study and the naturalistic paradigms from previous studies may respectively activate approach and withdrawal motivations. Future empirical contributions should focus on the mechanisms guiding this kissing asymmetry, particularly regarding other conventions of kissing.

CHAPTER 3

FROM FIRST-KISSES TO FAMILY: EXTENSION OF KISSING CONTEXT

Prior to my research program, the literature addressing turning asymmetries for lip kissing have solely focused on one type of kiss: a romantically-motivated one. The opportune coincidence of the trend of First Kiss films provided a context unique to anything conceivable in a lab, as willing participants had to share a potentially awkward and possibly gratifying first kiss. To summarize, 230 pairs of strangers facilitated to kiss by filmmakers displayed no significant directional bias, which is both a finding and a kissing context that contrasts with the consistently observed right-turn bias for romantic couples. This study illuminates that the purpose of the kiss can influence the strength of lateral turning orientation of kissing behaviour.

Fundamentally, my study cannot answer *why* contextual circumstances attenuated this bias; rather, it questions the predominant theory that head-turning arises from congenital mechanisms observed during infancy. If this hypothesis were supported, the rightward directionality, parallel to romantic mouth kisses shared between adults, should persist. To further delve into contextual aspects of kissing, study two explores kisses that are planted on the lips between a parent and child.

Comparable to a social kiss, the intended purpose of "parental" kissing is motivated differently than a romantic one. The romantic kiss is defined by its relational and sexual motives (Moore, Kulibert, & Thompson, 2017), whereas a parent kissing a child may be conducted to show affection or emotional support (Moon & Hoffman, 2008). Interestingly, parent-child kissing is also unlike romantic kissing as suggested from anthropological research. Kinship forms of kissing are speculated to be universal (Eibl-Eibesfeldt, 1972), whereas a recent ethnographic study found that romantic kissing is hardly universal; from 168 cultures surveyed, only 77 (46%) demonstrated "romantic-sexual" forms of kissing (Jankowiak, Volsche, & Garcia, 2015).

The following paper is published in the journal *Laterality: Asymmetries of Body, Brain, and Cognition* in the special topics issue, “The Legacy of M. P. Bryden”. Submission of this paper required explicit discussion of its contribution to the work of the late Phil Bryden, which is apparent throughout this document.

In general, study two was guided by the following research question:

2) Does the type of kissing partner and context of the kiss influence the strength or directionality of turning bias?
    a. Is a comparable rightward bias exhibited by both a romantic kiss between adults and a parental kiss between parent and child?

CHAPTER 4

FAMILY MATTERS: DIRECTIONALITY OF TURNING BIAS WHILE KISSING IS MODULATED BY CONTEXT

To share a mouth-to-mouth kiss with a romantic partner is one of the most intimate forms of physical affection. Though this action tends to be performed intuitively, a decision must be made for which direction one should turn to kiss the recipient. Lateral behaviours performed by individuals are typically expressed based on what feels most natural, such as which hand we choose to write with, as well which direction we choose to kiss – right, left, or central. Previous research by the late Phil Bryden demonstrates that humans elicit various motor asymmetries (i.e., handedness, footedness; Elias, Bryden, & Bulman-Fleming, 1998; Lake & Bryden, 1976; McManus & Bryden, 1992), and since his legacy, a consistent lateral turning bias when kissing has been established (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; Ocklenburg & Güntürkün, 2009).

Güntürkün (2003) discovered this lateral bias by publicly observing couples to note their turning direction when kissing. A surprisingly disparate proportion was observed, as 80% of couples performed right-turns when kissing. Further study proposed that rightward turning may have been guided by a lateralized emotive bias (Barrett, Greenwood, & McCullagh, 2006) because positively motivated behaviours, such as kissing a romantic partner, tend to similarly elicit rightward biases (e.g., posing; Nicholls, Clode, Wood, & Wood, 2002). The potential influence of emotional attachment between kissing partners was controlled by introducing a neutrally valenced kissing recipient, a human-sized mannequin (Barrett, Greenwood, & McCullagh, 2006; van der Kamp & Canal-Bruland, 2011; Ocklenburg & Güntürkün, 2009). When participants were presented with the mannequin when it was centrally positioned, a comparable kissing bias was found, as 77% of turns were directed to the right (Barrett,

Greenwood, & McCullagh, 2006). Interestingly, this bias persisted for participants with a right-turning preference even when the mannequin was angled to receive a left-turn kiss – participants would simply overcompensate their right-turns to accommodate for their preferred turning direction (van der Kamp & Canal-Bruland, 2011).

The current theory for the mechanism driving the right-turn kissing preference postulates that this motor bias is a product of a right head-turning bias observed in early infancy (Güntürkün, 2003; Ocklenburg & Güntürkün, 2009). As early as 38 weeks of gestation, infants tend make pronouncedly more right-head turns which dissipates as they learn to stabilize a mid-line posture (Coryell & Michel, 1978; Hopkins, Lems, Janssen, & Butterworth, 1987; Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, Van Geijn, & Hopkins, 1994). Although the head-turning bias disappears during infancy, it is theorized that it innately persists into adulthood but exhibited as a kissing bias. A recent inquiry has challenged this theory by investigating how other factors, such as a culture's predominant reading direction, contribute to kissing preferences (Shaki, 2013).

Cross-cultural research by Shaki (2013) examined the effect of spatial experience on turning bias, as some lateral preferences (e.g., aesthetic preference) demonstrate a reversed bias between regions with predominant left-to-right or right-to-left reading languages (Chokron & De Agostini, 2000; Smith & Elias, 2013). A culture's geographical region can also impact the strength of motor biases (i.e., handedness; Ardila et al., 1989; Ida & Bryden, 1996; Singh & Bryden, 1994). Parallel to the methodology of the previous turning bias studies, couples were observed kissing in public and the mannequin-kissing task was administered in countries with official languages that read from left-to-right (Italy, Canada) and right-to-left (Israel, Palestine). The findings did indicate a reversed turning bias, as significantly more left-turns were exhibited

for Arabic and Hebrew readers for both the observation and experimental components of the study; a rightward bias remained for English participants.

Given the evidence presented by Shaki (2013), it appears that other variables can affect the direction of turning preference, leading us to the following research question: Can the emotional context of the kiss influence kissing bias? The current literature has exclusively focused on kisses between romantic partners, though people kiss for purposes other than romantic gestures, such as the affection of a parent kissing their child. A weaker or reversed bias between a parental and romantic context could be presented, as other lateral behaviours have revealed opposing biases dependent on the emotional context. Individuals asked to pose for a portrait, for example, tend to display more of their right-cheek when provided with a concealed emotional context, but with their left-cheek when asked to express as much emotion as possible (Nicholls, Clode, Wood, & Wood, 2002).

An additional unexplored mediator of turning bias is the sex of the kissing couples. Prior research has demonstrated that lateralized behaviours, such as handedness, evidence small but significant differences when comparing males and females (Lake & Bryden, 1976; Voyer, 1996, 2011). By including a parental kissing context, the presented study also investigates the influence of sex on turning bias between parent and child partners. Examining the effect of sex on lateralized turning preference further contributes to the established research by Bryden on sex differences of behavioural asymmetries (Lake & Bryden, 1976; Kansaku, Yamaura, & Kitazawa, 2000).

The purpose of the present study was to address the possible influences of context and sex on the directionality of turning bias when kissing. In order to observe kissing direction, the study employed an archival approach by collecting online images of parent–child and parent–parent kissing and coding for the turning direction (i.e., left, right, or central); this methodology is

comparable to prior archival studies (Acosta, Williamson, & Heilman, 2013; Burkitt, Saucier, Thomas, & Ehresman, 2006). We predicted a right-turn bias for both the romantic and parental kissing contexts which is consistent with the direction of bias studied in Western cultures.

The parental context would enable sex differences to be addressed by comparing turning biases between parent and child partners. A stronger turning bias is expected for males (i.e., fathers and sons), as previous evidence has suggested that males tend to express stronger lateralized functions than females (Inglis & Lawson, 1981; Lake & Bryden, 1976; Kansaku, Yamaura, & Kitazawa, 2000). The current study will contribute to the limited literature on the non-verbal behaviour of kissing.

Materials and Method

A total of 529 images of parent–child kissing were collected using the websites Google Images, Pinterest, and Instagram. The target keywords were "Mother kissing daughter," "Mother kissing son," "Father kissing daughter," and "Father kissing son" on Google Images and Pinterest, and "#daddykisses" on Instagram. Of the parent-child categories, 156 were collected for mother-daughter, 134 for mother-son, 113 for father-daughter, and 126 for father-son kisses. Images with possible cultural biases were excluded; this was specifically for fathers kissing brides on their wedding day since it is customary for the father to stand on the right. To examine romantic or "parent– parent" kissing, an additional 161 photos were collected from Google Images using the keywords "Parents kissing". Only images in which at least one child was present were chosen to imply that the couples were parents.

A kiss was characterized as lip-to-lip contact between kissing partners. Turning direction was coded by discerning the obvious head-turning direction or the side of the face on which the nose was oriented. Photos were chosen in the order that they were presented on each website and if they qualified as a mouth-to-mouth kiss. Data were collected from websites using the target

keywords until the selection of images had been exhausted. The variables coded included the turning direction (left = −1, centre = 0, right = 1) of the kiss, kissing context (romantic or parental), sex of the child, and the sex of the parent (Figure 1).

Figure [4-1]. Examples of romantic and parental kissing. The left photograph illustrates a romantic, right-turn kiss between parents, and the right image demonstrates a left-turn, mother-daughter parental kiss. Publication permissions were granted by both the photographers and individuals in the photographs.

A second rater that was blind to the hypotheses of the study recoded the images to verify the direction of the kiss and to ensure that there were no duplicate images collected from the primary researcher. Two-thirds of the images were reanalysed by coding the first 100 images from each kissing category (i.e., mother–daughter, parent–parent, etc.). A Cohen's Kappa determined that turning bias between the two coders was in high agreement, $\kappa = .96$, (95% CI, .944 to .983), $p < .001$; therefore, we proceeded to analyse the full dataset.

Results

A one-way ANOVA was used to compare if turning bias was different between romantic and parental kissing contexts. When computed, the Levene's testing the assumption of

homogeneity was violated, $F(1,688) = 30.677$, $p < .001$. A Welch's ANOVA was run and revealed a significant difference between groups, $F(1,236.13) = 17.027$, $p < .001$, $\eta 2 = 0.03$, indicating that there were more right-turns given in a romantic context ($M = .211$, $SD = .918$) in comparison to parental kissing ($M = -.119$, $SD = .788$; see Figure 2 for contrasts of proportion). One-sample *t*-tests were then computed for both kissing contexts to examine if the directionality of bias was significantly different from zero (i.e., no turning bias). As consistent with the previous research, a right-turn bias was illustrated for the romantic context, $t(160) = 2.92$, $p = .004$, Cohen's $d = .462$; however, the parental context displayed a left-turn bias, $t(528) = -3.48$, $p = .001$, Cohen's $d = -.303$. These results collectively demonstrate that turning direction was dependent on the kissing context.

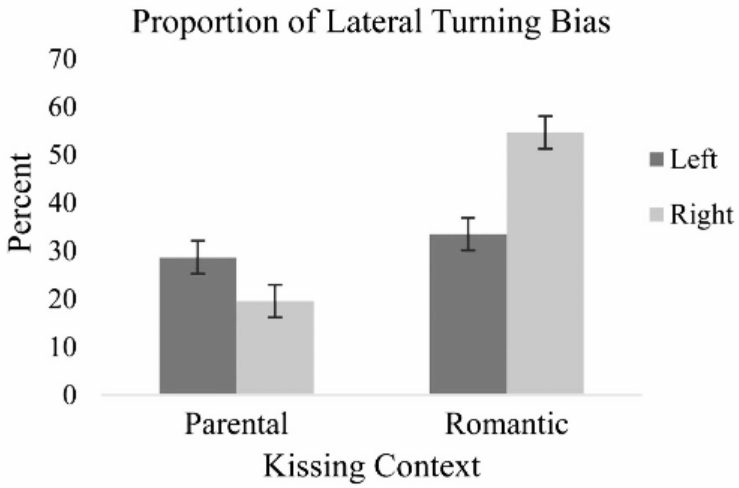

Figure [4-2]. Proportion of lateral turning direction of parental and romantic kissing. Parent–child kissing partners displayed significantly more left-turns in comparison to right-turns, whereas romantic partners made more right-turns than left-turns. Central kissing was excluded to illustrate the lateral differences. Error bars are computed as standard errors.

A one-way ANOVA was also used to examine the influence of sex on turning bias between each parent–child kissing group. The analysis indicated that there were no significant

differences between the four parental groups, $F(3,525) = 0.201$, $p = .896$, suggesting that turning bias was not influenced by the sex of the parent or child kissing partners (see Table 1 for means and standard deviations).

Table 4-1. *Descriptives of Romantic and Parental Kissing Groups*

Kissing Group	*N*	M(SD)	SE
Parent-Parent	161	211(.92)	.03
Mother-Daughter	156	-.134(.79)	.063
Mother-Son	134	-.134(.81)	.07
Father-Daughter	113	-.133(.13)	.074
Father-Son	126	-.0714(.77)	.034
Total	226		

Post hoc Analyses

Due to the unexpected finding of an overall leftward bias for the parental kissing context, additional controls were selected to determine if the results were a consequence of possible confounding factors. The variable of asymmetric cradling was introduced, as cradling bias could have influenced more kisses to be from the same direction. This theory is grounded from previous research that has suggested a leftward cradling bias (Bourne & Todd, 2004; Matheson & Turnbull, 1998; van der Meer & Husby, 2006), which could have therefore contributed to a head-turning bias for the parent. When all directional cradling images were removed, a significant difference remained between romantic ($M = .2112$, $SD = .918$) and parental kissing ($M = -.1213$, $SD = .776$), $F(1,596) = 19.504$, $p < .001$, $\eta 2 = 0.032$, and significant leftward turning direction when parental kissing was explicitly examined, $t(436) = -3.267$, $p < .001$, Cohen's $d = -.313$.

The type of photograph was additionally coded for parent–child context images to inspect if professional or non-professional photographs influenced the direction of turning bias. Although any photographer could direct the individuals posing, professional photographs may have been more likely to have instructed posing which could have guided the turning direction. The amount of photographs in each condition was almost equal, with 52% of photographs appearing to originate from a professional source, which was noted by watermarks or the company that provided the image. When non-professional photographs were analysed, a leftward bias (M = −.14, SD = .052) was still presented, $t(251) = -2.733$, $p = .007$, Cohen's $d = -.345$, suggesting that turning direction was not dependent on the context of the photograph.

Discussion

Previous research examining lateral turning biases has consistently found a rightward kissing preference for adult couples from Western cultures (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; van der Kamp & Canal-Bruland, 2011; Ocklenburg & Güntürkün, 2009). The present study similarly reported a rightward turning bias when observing romantic kissing contexts; however, a significant left-turn bias was exhibited for parental kissing – a finding that is novel to kissing bias research. Sex differences between parent and child turning direction were also analysed but did not report any significant differences. This finding conflicts with our previous assumption that males would display a stronger turning bias, as some lateralized behaviours (e.g., handedness) have been suggested to be slightly more pronounced in men (Inglis & Lawson, 1981; Kansaku, Yamaura, & Kitazawa, 2000; Lake & Bryden, 1976). The outcome of the present study suggests that other mediating factors may direct the strength of turning bias thought to be facilitated by the left-hemisphere's dominance of motor function. Our explanation for the reversed turning bias for the parental context is that it is a learned lateral behaviour.

The position in which parents kiss their children most throughout the beginning of their child's life is likely while the parent is cradling their infant. Parents would predominantly cradle using their left arm, as indicated from the literature on lateral cradling biases (Bourne & Todd, 2004; Matheson & Turnbull, 1998; van der Meer & Husby, 2006), which could encourage parents to turn their face to the same side when kissing their child. A left turn kissing bias could persist beyond the stage of cradling due to the repetitive movement in that direction since it may feel most natural. Cradling is also relevant for the absence of sex differences demonstrated in the present study, as some cradling research examining the sex of the mother, father, or child similarly reported no significant cradling differences (Bogren, 1984; Dagenbach, Harris, & Fitzgerald, 1988; Julius Harris, Spradlin, & Almerigi, 2007). A learned preference could also be interpreted for the right-turn bias during romantic kissing.

Research investigating brain function of couples in new relationships have evidenced increased activation in the left anterior cingulate cortex and caudate regions, structures known to be involved in the motor and reward circuitry (Aron, Fisher, Mashek, Strong, & Brown, 2005; Bartels & Zeki, 2000; Kim et al., 2009). Kissing requires motor control and is typically motivated by feelings of reward, which could guide more right-turns due to the increased use of the left-hemisphere at the beginning of relationships. Right-turned kissing may feel most intuitive onward in the relationship, which would again illustrate that turning direction could be guided by learned behaviours.

The archival approach of the present study was practical for investigating real-world kissing behaviours, although various limitations were noted. An evident shortcoming is that the kissing partners may have been persuaded to pose in a specific direction depending on the placement of the camera. Although the type of photograph was evaluated (i.e., professional or non-professional), the person taking the photo could still have instructed the models how to pose,

or the kissing partners themselves may have chosen to position themselves in a certain way relative to the camera. Romantic kissing, however, did still present the right-turn bias similarly observed in the kissing bias literature (Güntürkün, 2003). Regardless, future study should consider naturalistic observation or a mannequin-kissing task as used by previous studies to eliminate the possible confound of a photographer or posing bias.

An unexpected limitation also resulted from the photographic medium for parent–child kissing, as many of the images had an unclear turning direction due to the size difference between children's and parent's faces – these questionable biases were coded as central kissing, as there was no definitive turning bias. Central kisses could have also been a consequence of being photographed, as it could have been that either the parent or photographer wished to display the model's faces equally. Further investigation could instruct parent and child participants to kiss to resolve the expectancy of a balanced photograph.

The present study offered an original approach to the lateral turning bias presented when kissing by observing if kissing context and the sex of parent–child partners influenced the directionality of bias. Our research demonstrated the novel finding that turning bias was modulated by the context of the kiss, as a leftward directionality was observed for the parental context and a reversed rightward bias for romantic kissing. Further study should examine if the parental left-turn bias presented in the archival analysis is similar when observed within real-world kissing behaviour. The impact of a learned turning preference via cradling is an additional avenue to explore that is theorized from the current study. Context as a modulator of this lateral motor bias offers new possibilities of research for kissing behaviour which warrants further exploration.

CHAPTER 5

EXTENDED DISCUSSION OF FAMILY MATTERS

At the time of writing the manuscript for the previous study, the interpretation for the left-turn bias for parental kisses was in light of a corresponding infant-cradling preference, which I suggest is still a conceivable explanation. However, in this publication, we suggested that the right-turn bias could emerge from left-lateralized activation in motor areas observed from brain activity of newly formed romantic partners. An explanation for the right-turn bias is provided from further contemplation of how hemispheric processes direct turning preferences. Revision of the discussion would reflect the approach-avoidance model of emotional lateralization highlighted in study 1.

Goal-oriented behaviours, such as kissing a romantic partner, are directed rightward due to the specialization of the left-hemisphere's approach-motivated emotions, whereas when performing a negatively-motivated kiss (i.e., oriented by fear or disgust), such as kissing a stranger, the bias goes away. Although a parent kissing a child is not a goal-averse behaviour, the explanation that prior experience from cradling modulates the rightward direction of bias logically fits with the approach-avoidance model.

CHAPTER 6

FROM MOTOR OUTPUT TO COGNITIVE INPUT: PERCEPTUAL EVALUATIONS OF STIMULI WITH TURNING ASYMMETRIES

As suggested by our research findings from chapters 2 and 4, turning biases during kissing behaviour do not result from an innately-driven lateral preference as previously speculated. If a universal right-head-turn preference ultimately facilitates kissing asymmetries, this directionality should persist cross-culturally, but this was not supported (Chapelain et al., 2015; Shaki, 2013). Moreover, this directionality should also be displayed in social and parental contexts. In chapter 2, no lateral preference was found from videos of strangers kissing. In chapter 4, images of parent-child kissing couples displayed a significant leftward bias, a direction that contrasted the romantic, parent-parent context.

Chapter 6 further explores the turning behaviour within parental and romantic contexts. This study also seeks to extend the literature on kissing asymmetries to capture how individuals cognitively respond to stimuli displaying turning biases rather than continuously studying motor responses of turning direction (i.e., the actual behaviour itself) to investigate perceptions of turning biases. We speculate whether turning behaviour, combined with contextual differences, is bidirectional (i.e., how individuals pose in one context corresponds to perceptions of others performing that action). Specifically, my curiosities are the following:

3) Does the turning direction convey inherent qualities about the kiss?
    a. Are right-turn (vs left-turn) kisses appraised to be more passionate?
    b. Does turning direction of a parent-child kissing context also influence affective evaluations of the kiss?

CHAPTER 7

PERCEPTIONS OF KISSING INFLUENCED BY TURNING DIRECTION AND CONTEXT

When motioning towards a partner to initiate a kiss, an intuitive decision is made to turn your head left or right. Although kissing requires two people to jointly come to this spontaneous action, and hopefully without an awkward collision, the lateral turning direction is not exhibited at 50/50 chance. Reported from a voyeuristic study, Güntürkün (2003) observed the turning direction between couples kissing in public spaces (e.g., airports, beaches, parks) and found that about two-thirds performed a right head turn when locking lips.

By considering kissing interactions, nonverbal cues could be elicited from kisser A to subtly signal to kisser B the direction of turn. Although almost impossible for an observer to distinguish between the leader and the follower, several studies have eliminated the reciprocated head turn by introducing a human-sized doll as the kissing partner (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009 van der Kamp & Canal-Bruland, 2011). Independent of the partner's influence, the right-turn bias persists, as 66% (Shaki, 2013) to 81% (Bartrett et al., 2006) of kisses displayed a rightward preference.

Two competing theories are suggested to direct the right-turn tendency when kissing. The first theory proposes that it is an innate motor bias. Support for this prediction arises from findings that foetuses near the end of gestation conduct significantly more right versus left head turns (Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994). This direction of head turn continues to be observed from infants' supine postures until around 3-6 months of age or until the infant gains the ability to stabilize a mid-line posture (Coryell & Michel, 1978; Hopkins, Lems, Janssen, & Butterworth, 1987). The head-turning bias thus becomes less visibly apparent but is noticeable later in life when leaning in for a kiss.

A recent theory postulates that turning bias is guided by contextual factors rather than by an innate preference. Examining the influence of native reading direction, Shaki (2013) found an opposing left-turn bias when observing naturalistic and mannequin kisses from regions with right-to-left orthographic languages (i.e., Arabic, Hebrew). This is evidence against the theory of turning preference arising from a predetermined cause, as motor biases like handedness tend to be relatively stable across cultures (Dragovic, 2004; Gilbert & Wysocki, 1992). The context of a kiss also plays a role beyond the cultural sense, but rather, in the context of the *type* of kiss.

Sedgewick and Elias (2016) acknowledged that the previous studies were focused on one type of kissing convention: a *romantic* context. Of course, humans kiss for a variety of reasons, and therefore, a distinct lip-to-lip kissing context was introduced, namely, one shared between a parent and child. Turning biases were compared from family portraits with parent-child kissing (the parental context) to parent-parent kissing (the romantic context). The reliable right-turn bias was predicted as the images were sampled from websites with a left-to-right orthography (i.e., English). For the romantic context, the right-turn bias was exhibited; however, a contrasting left-turn bias was found for parent-child kissing partners. This finding indicates that visuospatial habits, such as native reading direction, are not the only modulators of turning bias (Shaki, 2013) and suggests that turning behaviour is linked to the emotional purpose motivated by the kiss.

The left-side bias exhibited during the parental context is both novel and consistent with the predominant direction of other socially-guided behaviours. For instance, a leftward bias for social cheek-kissing was discovered in seven of ten regions of France, regardless of the number of cheek-kisses performed (i.e., between one to four; Chapelain et al., 2015). Comparative research studying social-affiliative behaviour from Colombian spider monkeys similarly observed a left-side bias when analysing arm and face embraces (Boeving, Belnap, & Nelson, 2017). The behavioural context also exhibits opposite orientations with respect to other lateral

behaviours. Seating-bias studies found that when choosing a seat in a movie theatre, a right-of-center preference is displayed for individuals positively motivated to see the film (Harms, Reese, & Elias, 2014; Weyers, Milnik, Müller, & Pauli, 2006), but this bias disappears when framed with a negative motivation (Okubo, 2010). Likewise, lateral cheek-posing studies demonstrate that individuals present a left cheek when instructed to express as much emotion as possible, but a right-cheek bias when asked to conceal emotion (Nicholls, Clode, Wood, & Wood, 1999).

Relative to kissing bias, posing asymmetries have received considerably more attention (see Lindell, 2013 and Powell & Schirillo, 2009 for extensive literature reviews). For instance, motor responses of individuals exhibiting the posing behaviour have been investigated across a variety of contexts, including celebrity chef cookbook covers (Lindell, 2016), advertisements (Burkitt, Saucier, Thomas, & Ehresman, 2006), and political affiliation (Thomas, Loetscher, Clode, & Nicholls, 2012). This body of research has extended its study to *perceptions* of posing to include analyses of how images of posing behaviour influence evaluations of the model (i.e., emotional expressiveness, political affiliation; Harris & Lindell, 2011; Thomas, Loetscher, Clode, & Nicholls, 2012). For instance, portraits featured on webpages of natural science and engineering academics display a right-cheek bias, whereas scholars from English and Psychology presented a left-cheek bias (Churches, et al., 2012). This corresponds with perceptions of academic affiliation. Participants were presented with pairs of identical portraits, both an original and mirror-reversed version, and were forced to choose which orientation resembled a student in chemistry or English. Parallel to actual poses of academics, identical portraits were perceived as chemistry students when displaying the right-cheek but English students when the left-cheek was shown (Lindell & Savill, 2010). Therefore, the link between posing behaviour and perceptions functions bidirectionally; the way individuals typically pose under a certain condition corresponds to perceptions of others displaying that action.

Whether investigating romantic (Güntürkün, 2003; Shaki, 2013), "parental" (Sedgewick & Elias, 2016), or mannequin contexts (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011), the extant kissing-bias literature has been isolated to physical-motor output but has yet to explore its influence on perceptual input. In addition, the type of kissing behaviour, such as a parental context (Sedgewick & Elias, 2016), justifies further investigation. The purpose of the two studies conducted for the current paper are to examine if perceptual input for images of kissing couples are biased relative to the type of kissing context, namely, a romantic or parental kiss.

Our first study examines perceptual judgements of a romantic context and uses images of adults of the opposite sexes kissing. Comparable to the study design by Lindell and Savill (2010), this study employs a forced-choice response paradigm, whereby participants judge which kiss from pairs of original and mirrored images conveys a more passionate kiss. Passion was selected as our target adjective because within Western cultures, which is our population sample, lip-to-lip kisses shared between adults are conceptually associated with passion (Kirshenbaum, 2011; Moore, Kulibert, & Thompson, 2017) in comparison to a social gesture. We anticipate that the direction of turning bias for passionate kisses will be consistent with its motor response, the right-turn bias.

The second study is conducted using parallel methodology to explore perceptions of parent and child kissing couples. This study's task presents analogous instructions, but rather than judging which kiss is perceived to be more passionate, the adjective "loving" was substituted. The concept that kissing biases are influenced by context requires further examination, as the previous literature has explicitly focused on kissing between romantic partners. This extension will contribute to verification of this newly discovered modulating variable: kissing context.

If turning asymmetries during actual kissing behaviour correspond with perceptions of the kiss, and furthermore, if the context facilitates disparate perceptions based on turning direction, we should expect the following predictions:

H1: Visual stimuli of romantic couples depicting a right-turn (vs. left-turn) kiss will be selected as more passionate

H2: Visual stimuli of parent-child dyads depicting a left-turn (vs. right-turn) kiss will be selected as more loving

Study 1: Turning Bias and Perceptions of Passionate Kissing

Methods

Participants

Sixty-one participants (50 females; $M = 25.85$, $SD = 7.3$) were recruited through the University of Saskatchewan's Psychology Participant Pool and from an online bulletin posted on the University's student and faculty website; participant pool individuals were compensated with course credit. Fifty-six participants were right-handed and 5 were left-handed, which was evaluated using the Waterloo Handedness Questionnaire-Revised (Elias, Bryden, & Bulman-Fleming, 1998), and all participants had normal or corrected to normal vision. Ethical approval was granted by the University of Saskatchewan's Psychology Research Ethics Board.

Stimuli

A kissing-evaluation task presented slides featuring images of opposite-sex couples performing a romantic kiss. Each slide vertically displayed two images: A photo in its original orientation and a photo in its mirror-reversed composition (see Figure 7.1 for example stimuli). A total of 25 unique images were presented in the task (50 slides with counter-balanced photo

position), to which participants were asked to “Click on the picture you think displays the most passionate kiss”.

Stimuli were collected from the search engine Google Images. During image selection, the position of men and women from left to right and the direction of turn were approximately balanced: 6 featured the woman on the left of the image, performing a right-turn kiss (6 for a left-turn kiss), and 7 displayed the man on the left, giving a left-turn kiss (6 with a right-turn kiss). An equivalent number of stimuli displaying left and right-turned kisses were chosen in light of research demonstrating that individuals prefer original (vs mirror-reversed) versions of pictures, even if the original composition is unknown to the viewer (Nicki, Forestell, & Short, 1979). In the instance that individuals preferred original images, we are assured that the turning direction is equally distributed. The purpose of choosing an equal number of images with the man and woman positioned on the left is guided by a recent study by Suitner, Maas, and Ronconi (2017) which found that images of men were perceived as more agentic than women, and that agentic and communal subjects are respectively represented with the right and left of space. To add to our control, we wanted to eliminate any conceptual association with spatial location and gender.

Upon selection, the images were edited by cropping the background to ensure that each model occupied equal halves of the image. The dimensions were standardized to 4" x 3.5" for all images with the lip-contact oriented at 2" x 1.75". The task was administered via the online survey platform FluidSurveys. Slides were randomly presented in two blocks: Block 1 was one placement of pairs of images, and block 2 displayed the counterbalanced order.

Figure 7-1. Sample of romantic kissing stimuli. Images in the task were vertically-positioned.

Procedure

Upon accessing the study online through one of the recruitment methods, participants were directed to a consent form on the survey platform website, FluidSurveys. After implied consent was given, participants would begin the kissing evaluation task. Each window displayed the task's question at the top of the page: "Click on the picture you think displays the most passionate kiss". Under no time constraints, participants clicked on either the top or bottom image on the screen by using the computer's mouse or its touch-pad. The Waterloo-Handedness Questionnaire-Revised (Elias, Bryden, & Bulman-Fleming, 1998) followed the judgment task.

Results & Discussion

Response bias scores were calculated for each participant by subtracting the number of images displaying a left-turn bias from right-turn ones. A negative score would thus denote a left-turn bias and positive scores would designate a right-turn bias for images rates as "most passionate".

A one-sample *t*-test was used to analyze the directionality of bias scores, whereby a mid-point of zero represented no turning bias. When comparing participants' bias scores from zero, the results of the one-sample *t*-test indicated that images of couples conveying a rightward

turning bias were perceived to be more passionate than identical images displaying an opposite left-turn bias, $t(58) = 2.35$, $p = .022$, Cohen's $d = .62$, as represented by the positive mean bias score, ($M = .062$, $SD = .02$).

A paired-sample *t*-test compared whether original images of right-turn kissing were chosen more frequently dependent on the location of the image, that is, the top or bottom of the screen. This analysis was chosen to examine participants' selections of image-pairs displayed in their original (block 1) presentation with the selections from their counterbalanced orientation (block 2). The analysis reported no significant difference ($p > 0.05$), meaning that participants perceived right-turned kissing to be more passionate than left-turned kissing, regardless of the image's top ($M = .04$, $SD = .037$) or bottom ($M = .087$, $SD = .091$) order of vertical presentation.

The results from study 1 indicate that images of right-turn kissing are perceived to be more passionate than identical images displaying a left-turn kiss. This rightward directionality for perceptual input is consistent with the actual motor preferences observed for romantically-motivated kisses from Western cultures (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011). This bidirectional link illustrates that individuals' perceptions translate to the predominant actions from previous studies. Due to the methodological similarities between studies 1 and 2 as well as our focus on contextual comparisons, our interpretations from this study will be comprehensively discussed following study 2, which examines perceptions of a parental-kissing context.

Study 2: Turning Bias and Perceptions of Parental Kissing

Methods

Participants

A total of 113 participants (86 females, 27 males) between the ages of 18 and 50 ($M = 21.31$, $SD = 6.29$) were recruited and compensated through means parallel to study 1. The

majority were right-handed (101 right-handed, 12 left-handed) and all participants had normal or corrected to normal vision. Ethics approval was similarly obtained by the University of Saskatchewan's Psychology Research Ethics Board.

Measures and Procedure

A kissing-evaluation task, parallel to the first study, was created but used stimuli of parental kissing. Participants were presented with pairs of original and mirror-image composites in FluidSurveys, to which they would choose one photo following the instructions, “Click on the picture you think displays the most *loving* kiss”.

Comparatively, 24 unique images were presented. The stimuli set consisted of 12 women and 12 men kissing a child, and 6 images within each group displayed the kiss between a daughter or son. Turning direction was balanced between groups; therefore, there were 3 right-turned and 3 left-turned kisses for father-son, father-daughter, mother-son, and mother-daughter dyads. Photos were also sourced from Google Images and were formatted to the same dimensions as study 1 (i.e., 4" x 3.5," kiss oriented at 2" x 1.75"; models shared equal halves of page).

Figure 7-2. Samples of parent-child kissing stimuli. Photos were chosen to display a profile view to clearly illustrate the turning direction.

An additional control was the spatial orientation of child-to-adults in the images. This was made with consideration to how humans cognitively represent conceptual information. Research

from grounded cognition posits that abstract concepts, such as time, are often mentally associated with physical space (Barsalou, 2008). For instance, left-to-right reading individuals perceive time in a corresponding manner, namely that the past is left, and the future is right (Bonato, Zorzi, & Umiltà, 2012; Ouellet, Santiago, Funes, & Lupiánez, 2010). Research using visual stimuli displaying antique and modern products find that images are preferred when the products are positioned congruently with their conceptual association to time (Chae & Hoegg, 2013). Numbers are similarly associated with lateral space, whereby left-to-right readers conceptualize small numbers with the left and large numbers with the right (i.e., the spatial-numerical association of response codes [SNARC] effect; Dehaene, Bossini, & Giraux, 1993; Wood, Willmes, Nuerk, & Fischer, 2008). We predict that a possible processing-fluency effect could occur, such that images with the child on the left and adult on the right may be selected more often due to its implicit congruency with time (past = young, future = adult) or numbers in ascending order (smaller numbers = young, larger numbers = adult). For this reason, the stimuli set had an equal number of original images with the child on the left and adult on the right.

Results & Discussion

Bias scores were created for each participant by subtracting the number of left from right-turned images that were selected as "most loving". Similar to study 1, negative bias scores would indicate an overall left-turn bias, whereas a positive score denoted a right-turn bias. The results of a one-sample *t*-test revealed that the mean bias score (M = .033, SD = .036) did not significantly differ from zero, as no directional bias was found, $t(111) = .462$, p=.645. Specifically, participants did not rate left-turn kissing as more "loving" than right-turn kissing. This lack of directional bias was not based on the original presentation of each image, as no significant difference was found when accounting for block presentation; a paired-sample *t*-test comparing mean bias scores from block 1 (M = .047, SD = .261) to block 2 (M = .019, SD = .196)

demonstrated no significant difference between block order (p>.05). Evidently, images were not chosen based on their vertical position on the slides.

General Discussion

When presented with visual stimuli of couples kissing, the turning direction of the kiss can change its affective evaluations. For our first study, identical images of romantic kissing were perceived to be more passionate when the head turn was to the right in comparison to the left. This is consistent with the direction of turning bias observed during actual behaviour between romantic couples (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; Shaki, 2013). For our second study, identical images of parent and child kisses were not perceived to be more loving for any direction of head-turning preference, as no significant directional bias was found. The attenuated bias is comparable to research analysing images of parental kissing (Sedgewick & Elias, 2016), though a significant leftward-turning direction was exhibited. Overall, our predictions were generally supported: Images featuring turning biases influenced perceptions of the kiss, and these perceptions differed based on its kissing context.

Considering that identical-image pairs were used across both studies (romantic and parental contexts), the difference in turning preference as a function of kissing context is a novel contribution, as the limited but extant research has focused explicitly on the behaviour itself. Our studies are modeled from research on lateral biases of head-turning behaviour when posing, which similarly convey a bidirectional association from actions to perceptions. However, affective qualities perceived from asymmetric facial-poses are logical, as the left and right hemi-face are controlled by contralateral hemispheres that differ in emotional processing and expression (Dimberg & Peterson, 2000; Sackheim, Gur, & Saucy, 1978). In contrast, no apparent physical quality is portrayed from the turning direction of a kiss. Alternatively, we suggest that

our stimuli exhibiting motor imagery influenced perceptions due to motor fluency and simulation.

From Actions to Perceptions: The Role of Mental Simulation

The notion that a mental simulation effect occurred comes from the area of embodied cognition. Embodiment theory demonstrates that viewing imagery of humans conducting motor actions can activate corresponding neural representations in the area associated with executing voluntary movements, the sensorimotor cortex (Prinz, 1997; Willems, Toni, I., Hagoort, & Casasanto, 2009). Importantly, this phenomenon is evidenced even in passive-viewing conditions where there is no expectation from the perceiver to facilitate motor actions (Beilock, 2008; Rieger, 2004; Tucker & Ellis, 1998). For instance, research by Willems et al. (2009) discovered that motor imagery of hand actions is body-specific in cortical representation; activation of areas involved in motor planning and execution were left-lateralized for right-handers, but right-lateralized for left-handers. Further, displaying motor imagery congruent to one's lateral preferences is found to influence the affective reactions to the presented stimuli, which in turn impact their choices for one item over another (Elder & Krishna, 2011). This stems from a motor fluency effect, during which individuals' natural interactions with their environment (e.g., how an individual manipulates a pen) corresponds to preferences of visual stimuli embodying that cognitive action. In other words, people like objects better when they can easily imagine interacting with the objects (Ping, Dhillon, & Beilock, 2009). Thus, viewing imagery that facilitates motor fluency (vs opposite preference) promotes mental simulation of conducting that action, leading to increased positive feelings and evaluations (Casasanto, 2011).

For the present study, we speculate that viewing interactions of couples kissing facilitated mental simulation of the behaviour in question. Therefore, due to the typical right-turning direction of romantically-motivated kisses, a context associated with passion, stimuli of right-turn

kissing are theoretically regarded as more fluent than a left-turn kiss. Regarding the parental-kissing context, the absence of directional bias is still a compelling finding, as the attenuated bias suggests that kissing bias depends on the emotional motivation of the kiss. These findings do not fit with the congenital account of kissing bias, as this theory predicts that a right-head turn would be generalized to all types of kissing. Thus, the following question remains: What is causing the right-turn bias for romantic kissing and the opposite (Sedgewick & Elias, 2016) or decreased bias for parental kissing? I briefly discuss speculations and possibilities with regard to emotional lateralization.

Our research findings do not directly provide theoretical contributions to explain *what* facilitates this turning asymmetry, but they certainly inform us that the existing congenital theory is no longer convincing. By acknowledging the motivational differences pertaining to types of kissing, such as romantic or non-romantic, we speculate that kissing bias is a product of humans' emotionally asymmetric brain function.

Potential Role of Hemispheric Specialization of Emotional Processing

By considering that kissing asymmetries can be modulated by native reading direction (Shaki, 2013), a factor known to influence visuospatial attention (Rinaldi, Di Luca, Henik, & Girelli, 2014), we predict that the affective motivation, an additional modulating variable of attention, could guide the attenuated bias from the current study based on the kissing context. Specifically, we anticipate that lateral bias is facilitated due to approach and withdrawal behaviour.

Romantic kissing.

The approach-withdrawal model operates under the premise that functional differences between cerebral hemispheres guide the direction of lateral behaviours. According to this model of emotional lateralization, positive emotions (i.e., happiness, anger) are associated with

approach-motivation, which is best characterized as goal-oriented, reward-driven behaviour (Davidson & Irwin, 1999b). Approach-oriented behaviours correspond to left-hemisphere activation; when positive affect is promoted, a relative increase in left prefrontal cortex is exhibited (Harmon-Jones & Allen, 1998; Tomarken, Davidson, Wheeler, & Doss, 1992), thus increasing attention to the right visual-field. Alternatively, the withdrawal system responds to negative emotions (i.e., disgust, fear), to which the behaviour is goal-aversive. Contrasting with approach-motivation, the withdrawal system is associated with right-hemisphere dominance, (Davidson, Ekman, Saron, Senulis, & Friesen, 1990), thus facilitating an opposing leftward bias.

Arising from the approach-withdrawal model of emotional lateralization, we theorize that romantic kisses correspond to approach-motivated behaviour, thus facilitating more right-turns from the left hemisphere's goal-oriented emotional function. Although kissing interactions are in response to a rewarding outcome, sociological research suggests that the motivation to deliver a quality kiss to a romantic partner is significant (Hughes et al, 2007; Wlordarski & Dunbar, 2015). American college students reported that the quality of a partner's kiss was an important factor in establishing a relationship; in fact, two-thirds of both female and male American college students disclosed a decrease in attraction to a partner of interest after an initial kiss (Hughes et al., 2007). The importance of kissing within established relationships is also reportedly significant and positively associated with partner satisfaction (Wlodarski & Dunbar, 2015). In general, we expect that it is not a controversial statement that kisses conducted between adult partners are driven by rewarding rather than avoidant properties.

Parental kissing.

There is currently no research to suggest that parental kisses are held to the same standard of quality or elicit comparable gratification, but we expect that it is non-controversial that the motivations and consequences of romantic kisses are not anticipated for social ones. Although a

parent kissing a child is of course not a withdrawal-motivated behaviour, our interpretation for the reversed turning bias for parent-child kissing is that this lateral behaviour is learned from prior experiences in parenthood.

In the beginning of a child's life, parents tend to predominantly cradle the child using the left arm, regardless of their hand preference (Bourne & Todd, 2004; Bruser, 1981; Matheson & Turnbull, 1998; van der Meer & Husby, 2006). This "cradling bias" is similarly theorized to stem from the brain's lateralization for emotions, such that the right-hemisphere's specialization of emotional processing implicitly orients the child in the contralateral left-visual field. Positioning the child in the left arm encourages a leftward facial turn when bottle-feeding or gazing at the child, which could therefore encourage parents to turn their face to the same left side when kissing their child. Consequently, the left-turn kissing bias may persist beyond the stage of cradling due to the habitual turning direction associated with the leftward embrace.

Although we only speculate that cradling may parallel the direction of kissing asymmetries, this prediction could function with our hypothesis. One noteworthy observation of Sedgewick and Elias' (2016) study of parental kisses is that these were actions demonstrated *by* (or at least very likely) actual parents. However, as with many research studies, our participants sampled were undergraduate students, a demographic that likely has less practices cradling, kissing, or experiencing the emotional connections of caring for their own child. Considering that affective evaluations of visual stimuli can be guided by previous motor experiences, this could have been a factor which negated the prediction of actions to perceptions for the parental context.

Limitations and Future Directions

An apparent shortcoming from our stimuli sets is that differences between image pairs were not completely isolated by kissing turn, as the physical composition of the images also changed. Thus, the direction of head turn was not only reversed, but also the rest of the physical

content within the image. Our attempt to minimize unexpected consequences arising from aesthetic composition preferences was by means of standardized editing; all backgrounds were cropped to only display the couple, kissers occupied an equal amount of space, and the location of men and children relative to women and parents were systematically chosen to account for conceptual associations of gender and age with lateral space. Future replication should consider creating stimuli illustrating kisses modified only by their turning direction.

An additional limitation is that we did not examine the turning preferences of the participants. Retrospectively, we note that this task would have provided fruitful information to understanding how motor responses are bidirectionally linked to cognitive evaluations. Therefore, our findings can simply conclude that perceptions of kissing display a right-turn bias, though its bidirectional association is not yet established. Future study should consider employing the mannequin-kissing task with the perceptual evaluation task, to which individuals' turning preferences can thus be analysed with respect to cognitive judgements. From this paradigm, valid conclusions can be drawn to examine potential motor fluency effects between left and right turners and corresponding perceptual biases.

One theoretical problem stems from the previous research finding that the right-side turning bias persists even when the receiver of the kiss is a neutral, inanimate partner: a mannequin head (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011). We argue that this directionality could persist for two reasons. In the absence of context, lateral biases continue to be expressed. As illustrated by posing biases, when asking participants to pose for a photo conveying as much emotion as possible, a left-cheek bias is presented (Nicholls et al., 1999). However, this directionality persists when observing actual portraits (Conesa, Brunold-Conesa, & Miron, 1995; LaBar, 1973; McManus & Humphrey, 1973). Because the participants performing the kisses on the mannequin

were from an undergraduate sample, their automatic assumption may have been to model how they would kiss a romantic partner, as these individuals likely have more direct experience toward a lover than a child. Further, the adult-size mannequin head and its placement at the same height as the participant could have primed participants to image kissing an adult on the lips (i.e., a romantic partner). Although the current study did not find any directional bias of context, further study should consider employing a similar mannequin-kissing task specifically framed for participants to lean in for either a romantic or child kiss.

Concluding Remarks

In conclusion, the present study illuminates how turning preferences for the non-verbal action of kissing corresponds to perceptions of kisses. Our research demonstrates that the reliable right-turning direction observed by individuals sharing a romantic kiss is similarly perceived to display a more passionate kiss than when the same couple illustrates a leftward turning direction. This phenomenon may arise from facilitating mental fluency of turning direction. Although perceptions of parent and child kissing did not translate to the opposing left-turn bias previously demonstrated through action, the eliminated bias further suggests that romantic, approach-motivated contexts distinctly promote right-turning behaviour. Our study provides the second account of the parental kissing context negating the typical right-turn bias, thereby questioning the prevalent theory guiding kissing asymmetries. Overall, the current findings contribute to a greater understanding of lateral actions and illustrate that emotional contexts can respectively influence turning asymmetries.

CHAPTER 8

FROM THE LAB TO THE AD: CONSUMER EVALUATIONS OF ADVERTISEMENTS WITH TURNING ASYMMETRIES

The preceding chapter broadened our knowledge on turning asymmetries, as the right-turn preference observed from motor responses of romantic-kissing behaviour corresponded to perceptual judgements of images featuring right and left-oriented kisses. These findings contribute to our theoretical understanding of how kissing biases are exhibited within earlier stages of cognitive processing.

Arising from perceptual evaluations of a romantic kiss, the next study questions whether perceptions transcend to preferential judgements, specifically when judgements are unrelated to the kiss itself. Advertisements are the stimuli used to capture these judgements. The purpose of explicitly examining the romantic context is due to its generalizability to real-world advertisements; upon exploration of advertisements with kissing, we noted that models demonstrate almost exclusively romantic kisses. Our main question for the final study is the following:

4) Do right-turn (vs left-turn) kisses in advertisements increase consumer attitudes and purchase intention toward the marketed product?

CHAPTER 9

THE CUSTOMER IS ALWAYS RIGHT: DIRECTIONALITY OF LATERAL TURNING BIAS IN ADVERTISEMENTS INFLUENCES CONSUMER JUDGEMENTS

From choosing which hand to throw a ball to finding a seat in a theatre, humans exhibit various behaviours performed more frequently to the left or right. Asymmetries that are most consciously acknowledged are often respective to our own bodies, such as the hand we prefer to write with. A less salient but equally persistent directionality bias has been demonstrated in everyday turning behaviour. Researchers have identified several turning biases: When examining shopping patterns, consumers more often navigate in a clockwise-orientation (Groeppel-Klein & Bartmann, 2007, 2009; Kholod, Takai, & Yada, 2011); when posing for an advertisement, models are more likely to turn left, thus displaying a right-cheek profile (Burkitt, Saucier, Thomas, & Ehresman, 2006); and when leaning in to kiss a romantic partner, a right head-turn preference is demonstrated for couples from Western cultures (Güntürkün, 2003; Sedgewick & Elias, 2016; Shaki, 2013). This last turning bias has received little attention from behavioural laterality researchers and has yet to be explored in potential applied implications, such as in the field of advertising.

Head-turning biases during kissing were discovered by Güntürkün (2003) who naturalistically observed 124 lip-to-lip kisses from couples in public spaces (e.g., airport terminals, parks) in the United States, Germany, and Turkey. Through these observations, Güntürkün (2003) identified that a disproportionate number of couples turned to the right to kiss; approximately 65% performed right head turns, whereas 35% turned left. This rightward turning preference has since been replicated across Western cultures (Ocklenburg & Güntürkün, 2009; Shaki, 2013). However, as affirmed by the researcher himself, this directional bias cannot generalize to individual turning preferences, as subtle physical cues could have been shared

between partners to facilitate the joint goal of turning in the same direction. Because only 65% of kisses observed were right-turns, it would be expected that some individuals possessed an opposite turning preference. To eliminate the partner's influence on the turning direction and to consequently reduce the emotional attachment between kissing partners, a less realistic, more eccentric, kissing partner was introduced: an adult-sized mannequin head (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011).

In these studies, the plastic kissing partner was symmetrically aligned and vertically positioned to the height of the participant. Although the participant was independent from a human partner's influence, the right-turn bias persisted, and was in some cases pronounced; rightward directional biases ranged from 62% (Ocklenburg & Güntürkün, 2009) to 80% (Barrett, Greenwood, & McCullagh, 2006). Curiously, when the doll's orientation was incompatible for right turners (i.e., turned to the *kisser's* right, therefore to the dummy's left), this group was rigid with their turning bias, and they simply overcompensated their head turn to plant a kiss on their preferred side (van der Kamp & Canal-Bruland, 2011).

Two competing theories are suggested to direct the right-turn tendency when kissing. The first proposes that it is a biologically expressed motor bias. Support for this prediction arises from findings that foetuses near the end of gestation conduct significantly more right (vs left) head turns (Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994), and this observation persists postnatally from infants' supine postures until around 3-6 months of age (Coryell & Michel, 1978; Hopkins, Lems, Janssen, & Butterworth, 1987). Head turning is thus projected to be a transient bias. As one of our first observable motor preferences, head turning disappears when the infant can independently support itself and is later revealed during kissing behaviour. It is also speculated that head-turning preference is a product of lateral motor dominance. Motor biases like handedness, footedness, and eyedness tend to exhibit a joint-

pattern (Dargent-Paré, De Agostini, Mesbah, & Dellatolas, 1992; Nachshon, Denno, & Aurand, 1983). However, their relation to turning preference is unclear. Ocklenburg and Güntürkün (2009) reported a correlation between handedness and footedness, though van der Kamp and Canal-Bruland (2011), Barrett et al. (2006), and Shaki (2013) found no associations between the aforementioned biases.

A second, more recent theory postulates that turning bias is guided by contextual factors rather than an innate preference. When examining the influence of a culture's visuospatial habits, such as native reading direction, Shaki (2013) observed the reliable right-turn bias, but only from countries with left-to-right reading orthographies; a left-turn bias was observed from regions with right-to-left orthographic languages (i.e., Arabic, Hebrew). The role of context was also investigated by Sedgewick and Elias (2016) with respect to the type of kiss, as the entirety of research had focused on a romantically-motivated kiss. From analysing the turning preference of romantic (parent-parent) and parental (parent-child) contexts, a contrasting direction of bias was exhibited. In the romantic context, the consistent right-turn bias was observed, but for the parental context, a left-turn bias was found. Collectively, these studies indicate that kissing bias does not emerge from a predetermined cause and that the direction of bias is not consistent from kisses that are motivated by non-romantic impulses. Currently, no principal theory can account for head-turning asymmetries when kissing, though we continue to consistently observe the right-turn bias from romantically-motivated gestures.

Recent research from our lab recognized that the extant literature was focused on the physical motor output of kissing asymmetries but had yet to analyse its link to earlier stages of processing, such as perceptions of kissing. We sought to address this potential association by investigating affective evaluations of kissing from romantic and parental-kissing contexts. Our study employed a forced-choice decision paradigm displaying original and mirrored images of

couples kissing. We discovered that the turning direction of the kiss can change how the kiss is perceived; identical images of romantic kissing were perceived to be more passionate when the head turn was to the right (vs left), though parental kisses did not exhibit a directional bias with respect to a loving kiss. This indicates that the link between kissing behaviour and perceptions is bidirectional, such that how individuals kiss in one context corresponds to perceptions of others performing that action.

Our previous study explored how perceptions transcended to actions by participants conducting judgements *related* to the kiss. We question whether the right-turn bias will persist from evaluations *unrelated* to the kiss, for instance, of judgements of advertisements that illustrate a kiss. Considering the predominant right-turn bias of romantic kissing from naturalistic behaviour (Güntürkün, 2003; Shaki, 2013), doll kissing (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011), and perceptions, it seems intuitive to explore this particular kissing context. Romantic kissing is also representative of the type of kiss in advertising, as this convention of kissing was exclusively observed during stimuli collection of ads for the current study.

Consumer judgements of lateral biases have received some empirical attention, particularly regarding the more conspicuous motor asymmetry: handedness. Using advertising stimuli, Elder and Krishna (2012) examined whether consumers preferred ads when items were oriented in a manner that facilitated mental engagement with the product. Five studies were conducted using a single advertisement for each study, one of which was a model holding a hamburger with their right or left hand. The handedness of consumers was compared to consumer judgements of the ad, to which a motor fluency effect was exhibited; consumer judgements were higher for ads that featured the model using the hand congruent to participants' reported hand preferences. By similarly featuring models displaying a lateral turning direction, we expect

favourable judgements to be higher for the direction persistently viewed from actual kissing behaviour: the right.

The current study examines both preferences and consumer judgements for advertisements with models kissing. We employ two tasks: 1) A forced-choice decision task to examine ad preferences, and 2) A consumer judgement task displaying individual ads. We predict that when presenting two identical ads, one displaying a left and the other displaying a right head turn, participants will prefer right-turn ads. For the consumer judgement task, we hypothesize that models illustrating a right-turning direction will lead to higher attitudes toward both the ad and the brand as well as future purchase intention. Participants would also complete a doll-kissing task as a measure of turning preference. The results of this study will contribute to both laterality research and consumer behaviour of this peculiar but pervasive kissing bias.

Method

Participants

Sixty participants between the ages of 17 to 30 (M = 20.53, SD = 3.02) were recruited through the University of Saskatchewan's Psychology Participant Pool and compensated with course credit. This sample included 25 males and 33 females; two females were excluded from analysis due to visual impairments. When examining the distribution of lateral motor biases, 52 (89.7%) participants were right-handed, 47 (81%) were right-eye dominant, and 45 (77.6%) displayed a right-turn kissing bias. Ethical approval was granted by the University of Saskatchewan's Psychology Research Ethics Board.

Materials

Advertisements. Twenty ads were collected from Google Images by using search words related to popular brands or products (e.g., Gucci, chewing gum) followed by "ad with kissing". Ads were then edited using Adobe Photoshop CC (2009) to create a second version of each

original ad; the text, products, and overlay designs were preserved, but the turning directions of the kissing couple were mirror-reversed (see Figure 9-1 for sample ads). Maintenance of these details ensured that preferences were not due to compositional differences of the ad's layout, as lateral composition preferences are evidenced by variations of the lateral spatial content of both artworks (Levy, 1976; Vartanian & Goel, 2004) and product packaging (Deng & Kahn, 2009, Silayoi & Speece, 2007). Thus, the only difference between original and edited ads is the reversed models' placement, therefore illustrating opposite directions of head turn.

Figure 9-1. Samples of original and edited ad stimuli.

Four of the twenty ads were recreated due to compromised photographic quality (see Figure 9-2 for examples). The images selected to compose these ads were of couples who resembled the original ads' models, and comparable photographic styles were used (e.g., black and grey photography). This was crucial to not only maintain a convincing representation of the advertisement, but also to preserve the brand's identifying elements, as the brand's trade dress in ads are often conceivable simply from its design elements (e.g., colour schemes, graphics, textures; Cohen, 2008).

Figure 9-2. Examples of recreated ads. Ad A's left image exhibits a print ad with poor photographic quality due to the curvature of the magazine's pages, and ad B's top image had poor pixel resolution, whereby the common editing tools risk affecting the visual quality of the ad. The right and bottom images of A and B illustrate the recreated ads.

The distribution of turning bias from the ads' models were 10 left turns, 9 right turns, and 1 ambiguous turn; this ambiguous ad was because a left-turn and right-turn version were used in the same ad campaign. An equivalent number of original ads with left and right-turned kisses were chosen based on previous research indicating that individuals tend to prefer original (vs mirror-reversed) versions of pictures, even if the original composition is unknown to the viewer (Nicki, Forestell, & Short, 1979). Regarding body display in the images, 25% included faces only, 25% displayed the full bodies, and 50% were from the waists up.

Half of the ads selected conveyed a feminine gender appeal (e.g., perfume), 8 ads were characterized as unisex (e.g., men's and women's clothing brands), and 2 ads were geared towards men (e.g., cologne). Although this distribution of target gender appeal is not balanced, this disparity was representative of the ads with kissing observed from our search for advertising stimuli.

The collected ads also ranged in the types of products marketed. In general, ads featured products that were not directly relevant to kissing. For example, sunglasses (Ray-Ban) and jewelry (Tiffany & Co.) do not have an obvious utility to kissing, whereas products like lip balm or chewing gum entail interaction with the product. In total, we considered 9 ads to be directly-related and 11 to be indirectly-related. However, all products are low-involvement (e.g., cologne, clothes) rather than high-involvement (e.g., vehicles, insurance), meaning that the consumers' cognitive investments to purchase one of our advertised products are relatively low.

Dependent measures of Attitudes toward Advertisement, Attitude towards Brand, and Purchase Intention. (Spears & Singh, 2004). Adaptations of three common marketing measurements were used to assess consumer attitudes from our advertisements; namely, Attitude towards the Advertisement (AAD), Attitude towards the Brand (ABR), and Purchase Intention. AAD and ABR were assessed using 3-item, 7-point semantic differential scales to examine judgments about the ad's visual content (e.g., unappealing-appealing) and feelings about the brand (e.g., 1 = unappealing to 7 = appealing), respectively. A scale asking, "Would you purchase this ad's product for you or someone else?", was used to rate purchase intention (1 = definitely do not intend to buy to 7 = definitely intend to buy).

Familiarity with advertisement. An anticipated issue of using authentic ad stimuli was that individuals who had previously encountered our ads would prefer its original image regardless of the turning direction of the kiss. This prediction was guided by the mere-exposure effect (Zajonc, 1968), which postulates that prior exposure to an image increases liking for that stimulus when compared to an unencountered image (Janiszewski, 1993). Mere-exposure effects have been found from experimental marketing research, whereby visual priming of products influence product evaluations and choices (Baker, 1999) across a variety of product categories (e.g., clothing, magazines; Berger & Fitzsimons, 2008; Matheson & Turnbull, 1998). For this

reason, we asked participants to indicate whether they had previously seen the ad. One ad from our stimuli set was reportedly seen prior to the study by 10% of participants, and seven other ads were seen between 5-8.3% of respondents; we consider these rates to be low. Furthermore, of the seven ads allegedly viewed prior to the study, four of them were not actual ads, but they were among those that were re-created using different images. Therefore, we expect that our choice to use actual ads should not confound the results of our study.

Procedure

After providing informed consent, participants were seated in front of a computer screen displaying the computer task which was administered on the survey platform, FluidSurveys. The forced-choice preference task was presented first, which consisted of 48 slides, each displaying an original and mirror-reversed version of an advertisement. The task was divided into two blocks: The first oriented the original image on top and its mirror-reversed version below, and the second was the counter-balanced presentation. Participants were instructed to "Click on the advertisement that you think is the most aesthetically pleasing". In the block 1 presentation, participants were asked if they had previously encountered the ad.

The consumer judgment task was then presented, which displayed 48 slides of individual ads; 24 were original images, and 24 were its mirror-opposite composites. Accompanying each ad were the AAB, ABR, and PI questionnaires. Slides from both preference and consumer judgment tasks were in randomized order.

Upon completion of the computer task, participants' lateral turning biases were measured. Participants demonstrated their turning preference on an adult-sized cardiopulmonary resuscitation (CPR) ACTAR doll. The researcher stood behind the participant to get a clear view of the direction of head turn, which was noted on a separate response sheet. The study finished by participants completing an eyedness test and the Waterloo Handedness Questionnaire (Elias,

Bryden, & Bulman-Fleming, 1998). The study took approximately 40 minutes for each participant to complete.

Results

Advertisement Preference Task

Response bias scores were calculated for each participant by subtracting the number of preferences of left-turn ads from right-turn ones; negative scores would indicate an overall preference for ads with a left-turn bias, and positive scores would represent a right-turn bias. A one-sample *t*-test was used to analyze the directional of preference across participants' bias scores, whereby a mid-point of zero indicated no turning bias. A significant preference for ads with right-turn (vs left-turn) kisses was exhibited (M = .11, SD = .28), $t(60) = 2.93$, p = .005, Cohen's d = .757.

A paired-sample *t*-test was used to compare the selections of image-pairs presented in their original orientation (block 1) with the selections from their counterbalanced orientation (block 2) to examine if there was a different between choices of top and bottom images. The analysis reported no significant difference between mean responses biases for top (M = .25, SD = .658) from bottom ads (M = .1, SD = .28), $t(57) = 0.998$, p = 0.323, indicating that participants did not prefer the ads based on the location of the images.

A one-way ANOVA was conducted to compare the direction of the ad's turning bias (left, right) to the sex of the participant (male, female). When computed, no significant difference was revealed between mean ratings of male (M=.162, SD=.293) from female (M=.067, SD=.027) participants, $F(1,56) = 1.66$, p =.202, indicating that ads conveying a right-turn bias were preferred by both male and female participants.

Consumer Judgement Task.

Participant-response bias scores were again calculated by subtracting the ratings of the

original and edited ads (i.e., left from right turned) so that each image was compared against itself. Bias scores for each measure (i.e., AAD, ABR, and PI) were created to make comparisons across measures, as each questionnaire ranged in the number of items. Three one-sample *t*-tests were then used to analyse whether ratings were significantly different from zero; a significance level of $p = .02$ was used to correct for multiple comparisons.

Consumer judgements were rated higher across all tasks for models displaying right turning when kissing in comparison to left-turn compositions. Attitude toward the Ad ($M = .722$, $SD = .658$), $t(37) = 6.76$, $p<0.001$, Cohen's $d = 2.22$; Attitude toward the Brand ($M = .785$, $SD = .589$), $t(37) = 8.21$, $p<0.001$, Cohen's $d = 2.69$; and purchase intention ($M = .471$, $SD = .741$), $t(37) = 3.92$ $p<0.001$, Cohen's $d = 1.28$, all surpassed the adjusted significance level of $p = .02$ (see Figure 9-3 for mean bias scores per consumer judgement measure).

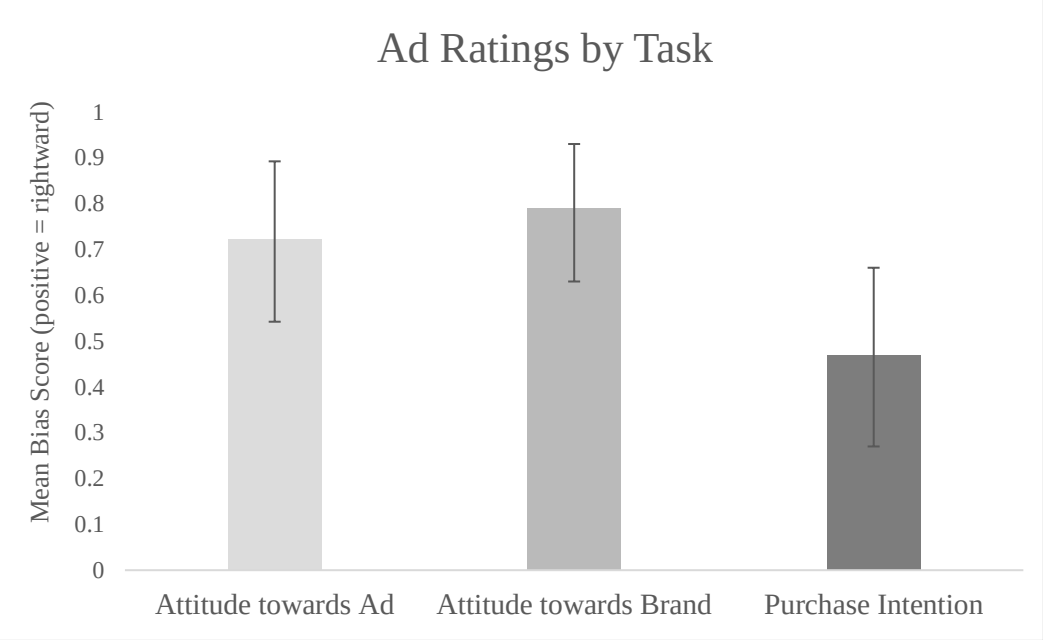

Figure 9-3. Mean bias scores for consumer judgement tasks. Positive scores reflect a preference for ads displaying a right-turn (vs left-turn) kissing direction. Error bars represent 95% confidence intervals.

Discussion

When leaning in to kiss a romantic partner, a rightward turning bias has been consistently demonstrated from observations of naturalistic kissing behaviour (Güntürkün, 2003; Ocklenburg & Güntürkün, 2009) and perceptions of kissing stimuli (Sedgewick & Elias, in preparation). We hypothesized that when presenting advertisements portraying kissing asymmetries, participants would exhibit both a preference and higher consumer evaluations for those displaying a right-turn bias. For our first task, pairs of identical images were preferred when the models' head turns were to the right in comparison to the left. In our second task, single ads displaying a right-turn (vs left-turn) kiss were evaluated more positively for both the ad and the featured brand, as well as future intentions to purchase the product. Our findings support our predictions that visual depictions of kissing bias can influence consumer evaluations. Further, our study reveals that perceptual judgements external to the kiss itself can influence decision making. As revealed from our doll-kissing task, the majority of participants displayed a right-turn preference (77.5%). Because the direction of models' kisses corresponded to the orientation of most individuals' turning behaviours, this finding suggests that mental embodiment of performing kissing consequently guided the direction of turning preferences to the right.

The notion that a mental simulation effect occurred comes from the area of embodied cognition. Embodiment theory demonstrates that viewing imagery of humans conducting motor actions can activate corresponding neural representations in the area associated with executing voluntary movements, namely the sensorimotor cortex (Prinz, 1997; Willems, Toni, I., Hagoort, & Casasanto, 2009). Importantly, this phenomenon is demonstrated even in passive viewing conditions where there is no expectation from the perceiver to facilitate motor actions (Beilock, 2008; Rieger, 2004; Tucker & Ellis, 1998). For instance, research by Willems et al. (2009) discovered that motor imagery of hand actions is body-specific in cortical representation;

activation of areas involved in motor planning and execution were left-lateralized for right-handers, but right-lateralized for left-handers. Further, displaying motor imagery congruent to one's lateral preferences are found to influence the affective reactions to the presented stimuli, which in turn impact their choices for one item over another (Elder & Krishna, 2011). This is described to stem from a motor fluency effect, such that how individuals naturally interact with their environment (e.g., manipulating a pen) corresponds with preferences of visual stimuli embodying that cognitive action. Simply stated, people like objects better when they are easier to imagine interacting with (Ping, Dhillon, & Beilock, 2009). Thus, viewing imagery that facilitates motor fluency (vs opposite preference) promotes mental simulation of conducting that action, leading to increased positive feelings and evaluations (Casasanto, 2011).

This body-preference link to viewing imagery conveying lateralized motor actions has been explored by Elder and Krishna (2012) with respect to the more conspicuous bias of handedness. Using advertising stimuli, the researchers intended to promote mental simulation of interacting with the product by presenting an ad featuring a left or right hand holding a hamburger. The ad was preferred when the displayed hand matched the participant's writing hand. In the current study, we speculate that a similar outcome was facilitated. From our sample, 77.5% percent of participants had a right-turn preference, and this preference corresponded to the directionality of kissing favoured in the ads.

Considering both the extant research on kissing asymmetries and our findings from the doll-kissing task, mental simulation guided from experiences of authentic kissing encounters may have guided the preference for right-turn ads. This is a limitation of our study, as we cannot attest that this guidance occurred. Of the sixty participants sampled, only 13 displayed a leftward turning preference, thus providing us with poor statistical power when analysing the connection between actual motor behaviour and judgements. To test this association, future study should

continue with participant recruitment until an adequate number of left turners are sampled to determine if the mental simulation hypothesis is supported; that is, we should expect an interaction between kissing preferences and the turning bias conveyed in the ad. However, actively recruiting left-turning individuals is complicated, as only one study has found a relationship between turning bias and handedness (Ocklenburg & Güntürkün, 2009), whereas the majority found no such association (Barrett, Greenwood, & McCullagh, 2006; Shaki, 2013; van der Kamp & Canal-Bruland, 2011).

Future research should also investigate whether kissing asymmetries are revealed from actual advertisements. Although we should expect the right-turn preference for models' kissing behaviours to be congruent to authentic kissing behaviours, advertising designers manipulate numerous aspects of the ad to create aesthetically appealing compositions. This is a thoroughly conceptualized process best explained by art directors (Phillips, McQuarrie, & Griffin, 2014), as the placement of the brand logos, brand name, ad text, product packaging, and models must be carefully considered. Portrayals of right-turn biases in advertising could additionally inform why participants in the current study revealed a preference for this bias, as this may be the orientation that they are repetitively presented with, and therefore, prefer due to consistent perceptions of this direction.

An overall strength of the current study arises from our choice to use stimuli of real advertisements. Psychology research with a focus on advertising is often criticized for its external validity; that is, the stimuli presented are often poor representations of realistic ads, and therefore, it is difficult to generalize research findings to authentic consumer evaluations. For this reason, we chose to include only images of actual ads of couples kissing at the loss of systematic control over the images. Alternatively, the research designs used in marketing research, specifically from the discussed study by Elder and Krishna (2011), can be less systematically controlled. The

conclusions from this study were that consumers preferred a hamburger ad when the hand featured was congruent to that of the consumer, thus alluding to a mental simulation effect. This was concluded from a single ad stimulus. Conceivably, other factors related to the lateral composition (Friedrich, Harms, & Elias, 2014; Levy, 1976) or lighting of the image (Hutchison, Thomas, & Elias, 2011; Sedgewick, Weiers, Stewart, & Elias, 2015) could have instead facilitated an aesthetic preference. Also, handedness was measured from one question: "which hand they use to write with?" However, hand preference is multidimensional, as skilled (e.g., sewing) and non-skilled (gesturing) tasks encapsulate one's hand preference (Coren, 1993). Future research should stress a thorough cross-disciplinary review to achieve the most well-informed research design that can be accepted from both theoretical and applied streams of research.

CHAPTER 10

GENERAL DISCUSSION

The scope of the extant literature on kissing asymmetries has explicitly focused on the turning direction of romantically-motivated kissing interactions. To broaden our scope of knowledge on kissing laterality, I conducted five studies exploring two central themes: 1) Turning bias as a function of the kissing context, and 2) how cognitive processes contribute to perceptions of kissing asymmetries.

Summary of the Major Findings

In the first study presented, I tested the turning directions of kisses from an unconventional non-romantic kissing context: a kiss facilitated by a film director between strangers. This inquiry was derived from a coincidental trend of First Kiss social media videos that culminated in 230 observations of kissing encounters. When the direction of head turns was analyzed, no significant directional bias was found. In light of these findings, the second study extended the investigation to another lip-kissing context: a kiss shared between a parent and child. Family photos were collected and these images with kissing were coded from online sources. By comparing the turning orientation of parent and child dyads (parental context) to kisses between parent couples (a romantic context), a contrasting preference was found; romantic kisses displayed the consistent right-turn bias, whereas parental kisses exhibited a reversed left-turn bias. These biases were significantly different from each other (see Figure 4-1).

For study 3, the dichotomous turning direction between romantic and parental kissing was further investigated while simultaneously exploring whether perceptual input of kissing biases corresponded to the direction of motor output. Studies 3a and 3b employ a forced-choice scenario in which participants were shown image-pairs of romantic and parental kissing couples and were asked to choose which one they perceived to be more “passionate” and “loving”, respectively.

These studies revealed that kisses between romantic couples were perceived to be more passionate when displaying a right in comparison to a left turn, whereas images with neither left nor right turns were perceived to be more loving for parent-child kissing couples.

The final study extends the perceptual aspects of turning bias to examine how cognitive evaluations unrelated to the kiss are influenced in the field of advertising. Original and mirror-reversed versions of advertisements with models kissing were displayed in a forced-choice preference task and consumer-judgement task. Models illustrating a right turn when kissing were preferred over left turn kisses when identical images were presented. When ads were presented individually, right-turn (vs left-turn) kisses elicited more favourable attitudes towards the ad, attitudes toward the brand, and increased intentions to purchase the product.

As consistently illustrated from the previous literature (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011), motor actions of romantically-motivated kisses are oriented to the right. Congruent directionality was demonstrated in study 2 for parent-parent kissing and in studies 3a and 4 for perceptions of images of romantic kissing couples. However, the right-turn bias was only evident from the romantic convention of kissing. Studies 1 and 2 addressing the non-romantic contexts of strangers and parental kissing discovered an attenuated and reversed direction of bias, respectively. I should note that the qualifying criteria of a kiss were parallel between romantic and non-romantic contexts: lip contact, face-to-face position, absence of hand-held objects, and an obvious direction of head turn (Güntürkün, 2003; Shaki, 2013). Therefore, it may be justly concluded that turning asymmetries when kissing depended on the type of kissing interaction.

In general, if head-turning when kissing was indeed the result of a transient bias as previously speculated (Güntürkün, 2003), other visibly apparent turning asymmetries should, theoretically, correspond to the right-turn preference. This is not the case. Participants asked to

turn during free-walking tasks, for example, exhibit a left-turn bias (Lenoir, Van Overschelde, De Rycke, & Musch, 2006; Mohr, Landis, Bracha, & Brugger, 2003), and this directionality is mirrored from naturalistic turning behaviour of consumers' shopping patterns (Groeppel-Klein & Bartmann, 2007, 2009; Kholod, Takai, & Yada, 2011). If, for some reason, kissing was the *only* head-turning bias guided from a transient bias, we would predict that left-to-right reading demographics would display a rightward preference across other conventions of lip-kissing. However, my studies examining non-romantic and parental-kissing contexts suggest that the context of the kiss matters; romantic kissing is directed right, whereas non-romantic kissing tends to either reverse or attenuate the lateral preference. These findings ultimately question why the significance of the kissing context guides the direction of turning bias.

A significant observation is that the purpose and motivations for romantic, strangers, and parental contexts of kissing inherently differ. The romantic kiss is defined by its relational and sexual motives (Moore, Kulibert, & Thompson, 2017). Moreover, the quality of its delivery and frequency of kissing in established relationships are positively associated with partner satisfaction (Wlodarski & Dunbar, 2015), and experiences of decreased attraction to a previous partner of interest were disclosed from two-thirds of surveyed college students (Hughes et al., 2007). Interestingly, sex workers refuse to kiss clients under the notion that kisses are deemed "too intimate" (Brewis & Linstead, 2000) to conduct with a stranger. This rejection is echoed from the requests of male clients; from 1,230 encounters observed, only 13% asked to French kiss (Stein, 1974). Overall, romantic kissing is incomparably motivated by emotions that express intimacy, physical pleasure, and passion (Kirshenbaum, 2011; Moore, Kulibert, & Thompson, 2017).

Kisses between strangers from the First Kiss videos conceivably did not share these same elements. Although participation was consensual, the motivation to deliver or the expectation to

receive a passionate kiss was predictably lower than that of a romantic one; moreover, the context was likely uncomfortable because most individuals were from North American cities that do not conduct social forms of kissing. Comparable to a romantic kiss, the intended purpose of parental kissing shares the purpose of providing emotional affection to the receiver (Moon & Hoffman, 2008). However, there is no research to support that the same standard of quality is upheld for a parental kiss, as the physical pleasure valued from a romantic kiss is not an intended purpose motivating a parental kiss.

Collectively, the results from our five studies question the theory that kissing asymmetries arise from an innate mechanism of motor bias. Our research findings highlight that the context of romantic kissing displays a right-turn bias, congruent to the direction of head turning presented in the early stages of human development (Cioni & Pellegrinetti, 1982; Konishi, Mikawa, & Suzuki, 1986; Ververs, de Vries, van Geijn, & Hopkins, 1994). This directionality was not reflected in non-romantic kissing contexts, suggesting that kissing laterality is not the product of a congenital head-turning bias. The influence of situational context on turning biases when kissing is novel to the kissing-bias literature. However, the directionality of other lateral turning biases is similarly dependent on the behaviour's purpose (i.e., posing; Lindell & Savill, 2010; Nicholls, Wolfgang, Clode, & Lindell, 2002; ten Cate, 2002) but is alternatively theorized to occur from functional differences between cerebral hemispheres. By acknowledging the utility and motivational differences between romantic and non-romantic conventions of kissing, I speculate that kissing bias is a product of humans' emotionally asymmetric brain functions.

Potential Role of Emotional Lateralization

Hemispheric specialization of emotional processing is fundamentally attributed to clinical research of patients with brain damage. As observed from early studies, patients with unilateral lesions to the right-hemisphere were reportedly unable to accurately portray facial representations

of emotion (Mills, 1912a/1912b) and were indifferent in emotional response (Babinski, 1914; Denny-Brown, Meyer, & Horenstein, 1952). Because of the decreased emotional arousal from right-hemisphere damage, it was deduced that this hemisphere was the dominant location of emotional processing. This guided the right-hemisphere theory of emotion.

Since then, other clinical accounts inform that left and right cerebral hemispheres differ in their *type* of emotional processing (Davidson, 1987/1988). For instance, patients with left-frontal lobe damage exhibit symptoms of depression (e.g., psychomotor impedance, detachment; Robinson & Downhill, 1995), whereas decreased right-frontal lobe activation is associated with mania (i.e., goal-oriented actions; Garcia-Toro, Montes, & Talavera, 2001). Respectively, hemisphere damage resulted in withdrawal and approach behaviours. These findings contributed to the development of the approach-withdrawal model of emotion conceptualized by Davidson (1987/1988/1990/1999) which postulates that emotion is not explicitly housed in the right hemisphere, but that each hemisphere differs based on the emotional properties motivating the behaviour.

The approach-withdrawal model operates under the premise that functional differences between cerebral hemispheres guide the direction of lateral behaviours. According to this model of emotional lateralization, positive emotions (i.e., happiness, anger) are associated with approach-motivation, best characterized as goal-oriented, reward-driven behaviour (Davidson & Irwin, 1999b). Approach-oriented behaviours are neurologically evidenced to correspond with left-hemisphere activation; when positive affect is promoted, a relative increase in the left prefrontal cortex is exhibited (Harmon-Jones & Allen, 1998; Tomarken, Davidson, Wheeler, & Doss, 1992), thus increasing attention to the contralateral right visual-field. Alternatively, the withdrawal system is specialized for most negative emotions (i.e., disgust, fear), to which the behaviour is goal-aversive. Contrasting approach-motivation, the withdrawal system is associated

with right-hemisphere specialization, (Davidson, Ekman, Saron, Senulis, & Friesen, 1990), thus facilitating an opposite leftward bias.

Approach-withdrawal motivation for romantic and strangers kissing. Arising from the approach-withdrawal model of emotional lateralization, I suggest that romantic kisses correspond to approach-motivated behaviour which facilitates more right-turns from the left-hemisphere's specialization of goal-oriented emotions. In general, we expect that it is an obvious and non-controversial statement that kisses initiated between consenting adults is driven by rewarding rather than avoidant properties.

By contrast, with respect to strangers kissing, it is complicated to infer what type of emotional motivation or kissing convention this is, as kissing a newly acquainted person arranged by an additional stranger is not a typical circumstance in reality. In theory, avoidance behaviour, such as fear and disgust, would be associated with kissing a stranger on the lips. However, in First Kiss videos, kissing partners willingly participated in this social experiment, and from our observations, some appeared to receive a considerably rewarding experience. Nevertheless, we would expect that the motivation to provide a quality kiss would be unparalleled to that of a romantic kiss, as there is no consequence of an exceptional kiss for a passing encounter.

Parental Kissing Context: The Mediating Role of Cradling Experience. Guided by the approach-withdrawal model, the left-turn bias exhibited from parental-child kisses would suggest that this context facilitated withdrawal-associated emotions. Of course, the nurturing aspects of a parental kiss (Moon & Hoffman, 2008) do not align goal-averse behaviour; rather, our interpretation for the reversed bias is that this directionality is learned from prior experience. In the beginning of a child's life, parents tend to predominantly cradle their child using the left arm, regardless of their handedness (Bourne & Todd, 2004; Bruser, 1981; Matheson & Turnbull, 1998; van der Meer & Husby, 2006). This "cradling bias" is theorized to be guided by the brain's

lateralization for emotions, such that the right-hemisphere's functions of emotional processing implicitly orients the child in the contralateral left-visual field. Positioning the child in the left arm encourages a leftward facial turn when bottle-feeding or gazing at the child, which could therefore encourage parents to turn their face to the same left side when kissing their child. Consequently, the left-turn kissing bias may persist beyond the stage of cradling due to the habitual turning direction associated with the leftward embrace.

Cognitive Judgements of Kissing Asymmetries

Whether examining romantic (Güntürkün, 2003; Shaki, 2013), parental (Sedgewick & Elias, 2016), or mannequin contexts (Barrett, Greenwood, & McCullagh, 2006; Ocklenburg & Güntürkün, 2009; van der Kamp & Canal-Bruland, 2011), the extant literature has focused on the physical motor actions involved with kissing. Our second area of exploration was intended to capture how individuals cognitively respond to stimuli displaying turning biases. Rather than continuously studying motor responses of turning direction, the actual behaviour itself, we intended to investigate its link to earlier cognitive processes, such as perceptions of the kiss.

When presented with visual stimuli of couples kissing, the turning direction of the kiss was found to change its affective evaluations. In our third study, identical images of romantic kissing were perceived to be more passionate when the head turn was to the right in comparison to the left. This is consistent with the direction of head turning bias observed during authentic behaviour between romantic couples (Barrett, Greenwood, & McCullagh, 2006; Güntürkün, 2003; Shaki, 2013), suggesting a bidirectional relationship between perception and action. However, this did not transcend to parental kissing, as no significant difference was found for perceptions of loving for right or left turns of images of parent-child kisses.

The purpose of study 3 was to explore how perceptions transcended to actions by participants conducting judgements *related* to the kiss. I questioned whether the right-turn bias

would persist with evaluations *unrelated* to the kiss, for instance, toward judgements of advertisements. Considering that the directional bias of romantic kissing was the most reliably demonstrated, choosing this context was an intuitive one. Furthermore, from our pursuit of collecting ad stimuli for our final study, models in advertisements almost exclusively conveyed a romantic kiss rather than any other convention of kissing (i.e., parental, social). By employing an ad preference and consumer judgement task, we found that pairs of identical ads were preferred when the models' head turns were to the right in comparison to the left, and that single ads displaying right-turn (vs left-turn) kisses were evaluated more positively with respect to feelings towards the ad and the brand, and future intentions to purchase the product.

Our studies support our predictions that visual depictions of kissing bias can influence affective qualities of a kiss (i.e., passion) and consumer evaluations of advertisements with kissing. In general, however, no apparent physical quality is portrayed from a turning direction of a kiss, whereas perceptions of lateral posing biases, for instance, physically differ from emotional expressions of the left and right hemi-face (Dimberg & Peterson, 2000; Sackheim, Gur, & Saucy, 1978). Alternatively, we suggest that our stimuli exhibiting motor imagery influenced perceptions arising from motor fluency and simulation.

The notion that a mental simulation effect occurred comes from the area of embodied cognition. Embodiment theory demonstrates that viewing imagery of humans conducting motor actions can activate corresponding neural representations in the area associated with executing voluntary movements, the sensorimotor cortex (Prinz, 1997; Willems, Toni, Hagoort, & Casasanto, 2009). Importantly, this phenomenon is evidenced even in passive viewing conditions where there is no expectation from the perceiver to facilitate motor actions (Beilock, 2008; Rieger, 2004, Tucker & Ellis, 1998). For instance, research by Willems et al. (2009) discovered that motor imagery of hand actions is body-specific in cortical representation; activation of areas

involved in motor planning and execution were left-lateralized for right-handers, but right-lateralized for left-handers. Further, displaying motor imagery congruent to one's lateral preferences is found to influence the affective reactions to the presented stimuli, which in turn impact their choices for one item over another (Elder & Krishna, 2011). This is described to occur from a motor fluency effect, namely that how individuals naturally interact with their environment (e.g., how they would kiss a romantic partner) corresponds to preferences of visual stimuli embodying that cognitive action. Simply stated, people like objects better when they are easier to imagine interacting with (Ping, Dhillon, & Beilock, 2009). Thus, viewing imagery that facilitates motor fluency (vs opposite preference) promotes mental simulation of conducting that action, leading to increased positive feelings and evaluations (Casasanto, 2011).

In the study 4, we speculate that a similar outcome occurred. From our sample, 77.5% percent of participants had a right-turn preference, and this preference corresponded to the directionality of kissing favoured in the ads. Study 3, however, did not measure lateral kissing preferences, and thus this conclusion cannot be drawn. Further discussion on this topic is provided in the subsequent section on limitations and future directions.

General Limitations and Future Directions

One apparent shortcoming has likely been questioned: What explains the right-turn bias with the mannequin kissing partner? Barrett et al. (2006) concedes that the doll represented a non-emotional, neutral context. When leaning in for a kiss, a right-turn preference would suggest support for the congenital theory of kissing bias, as preference would be independent of human partners. I propose an explanation. One consideration is that the mannequin does not introduce a *different* context of kissing, rather, it provides the absence of an authentic kissing scenario. In the absence of context, however, individuals continue to exhibit lateral biases unattributed to innate motor preferences. When asked to pose for a portrait with context (e.g., to convey as much

emotion as possible; Nicholls et al., 1999) or when posing for a picture without context (Nicholls, Wolfgang, Clode, & Lindell, 2002), individuals present a left-cheek bias. Considering that doll-kissing studies were recruited from an undergraduate sample, their cognitive schema for kissing is conceivably toward a romantic partner. Further, due to the size and corresponding height of the mannequin head, this could effectively prime participants to imagine how they would facilitate a kiss with a romantic partner, thus leaning rightward to plant a kiss on the plastic head. Our studies of both perceptions and consumer attitudes of romantic kissing inform us that simply viewing images of right-turn kissing influences evaluations; therefore, we do not think it is beyond the possibility that embodying a kiss with an adult-size partner is different to that of a human.

By discovering that novel kissing contexts contribute to the direction of kissing laterality, we opened several areas of research possibilities. To test our proposed theory that contextual differences of kissing bias arise from approach and withdrawal emotional processes, we suggest incorporating the mannequin-kissing task with vignettes that frame either a romantic or non-motivated kiss (i.e., kissing a stranger or extended family member out of obligation). This could effectively compare stranger-kissing in a lab-based paradigm. Vignette scenarios could similarly be performed for a parental context, by which a child-size doll head could be presented at a shorter height. This would address the hypothesis that the size and position of the mannequin-task primes participants to imagine how they would kiss a romantic partner. Using vignettes to frame a behaviour's context has been previously used to examine lateral biases that have received thorough investigation (e.g., posing, seating; Nicholls et al., 1999; Okubo, 2010).

Future study should address one limitation noted from my studies' examination of perceptions of a kiss. In our initial study examining perceptual evaluations, we did not collect the turning preference of participants, instead inferring that because most people turn right to kiss, a

rightward bias for perceived passion of the kiss was found. Our perceptions of the advertising study collected this useful information, though only 13 of 60 participants displayed a left-turn bias, thus resulting in poor statistical power when attempting to explore the connection between actual motor behaviour and judgements. To test the association between individuals' turning preferences on perceptions of kissing asymmetries, future study should continue with participant recruitment until an adequate number of left-turners are sampled to examine if the hypothesis of mental simulation is supported.

Summary of Contributions to Laterality

This research has challenged the prevalent theoretical mechanism guiding the rightward turning preference (Güntürkün, 2003; Previc, 1991), as introducing novel contexts of kissing facilitated an attenuated (strangers kissing; study 1; perceptions of parental kissing, study 3) or reversed direction of bias (parental kissing; study 2; see Figure 9-1). Further, I found that turning preferences observed from actual romantic-kissing behaviour corresponded to perceptual judgements of images featuring right and left-oriented kisses. These findings contribute to our theoretical understanding of how kissing biases are exhibited within earlier stages of cognitive processing.

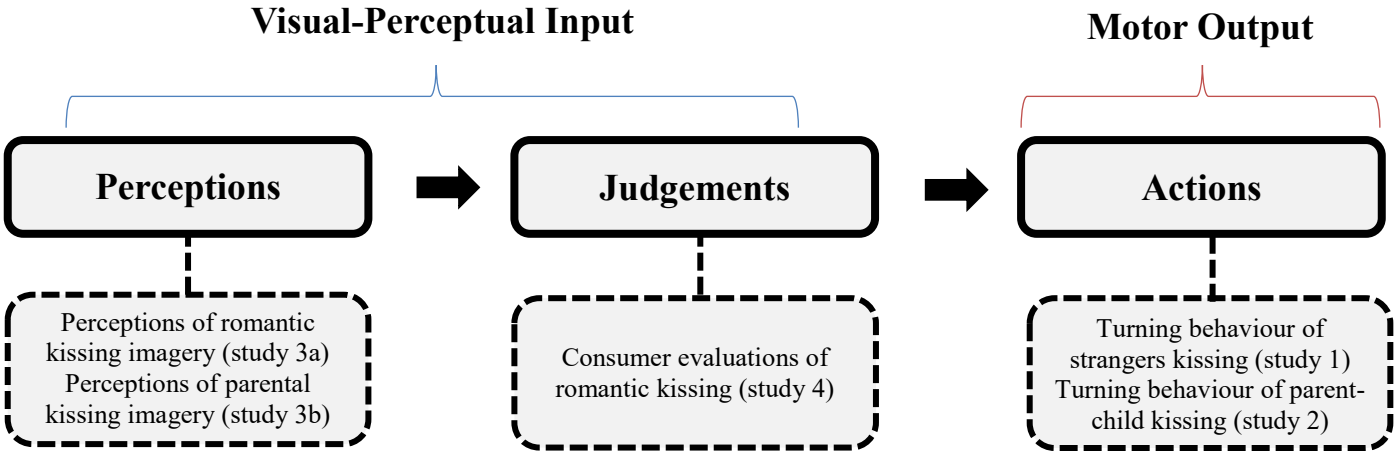

Figure 9-1. Research Contributions of Perceptual Input and Motor Output of Kissing Laterality.

Although the nature of laterality research is focused on developing theoretical contributions in its field, we extended our research to explore kissing bias' practical applications. I intended to enter the field of advertising, a domain where academic researchers are motivated to uncover mechanisms of persuasion. Although previous research has found an embodiment effect on ad preferences respective to handedness (Elder & Krishna, 2011), our results suggest a viable motor fluency effect from an equally persistent lateral behaviour. Importantly, our findings were with respect to authentic ad stimuli. Psychology research with a focus on advertising is often criticized for its external validity, namely that the stimuli presented are often poor representations of realistic ads, and it is therefore difficult to generalize research findings to preferences in real-life. At the risk of systematic control over the images, our findings suggest that ads displaying turning biases can guide consumer judgements in real advertisements displaying kissing.

Concluding Remarks

The intent of the four presented studies was to investigate the lateral turning biases exhibited from kissing behaviour with regards to non-romantic kissing conventions and perceptual responses to kissing imagery. An attenuated and reversed turning bias was observed in stranger and parental-kissing contexts which is contrary to the right-turn bias guided by the congenital account of kissing laterality. Perceptions of images that modeled a romantic kiss were evaluated as more passionate when displaying the turning direction congruent to naturalistic kissing behaviours: the right. This right-turn perceptual preference extended to consumer judgements of advertising stimuli. Taken together, this body of research counters the rationale that head turning when kissing persists from infant head-turning preferences while also contributing to our understanding of how kissing biases are exhibited within earlier stages of cognitive processing. Overall, our findings perhaps offer more questions than answers to this recently discovered bias, and they provide a variety of future areas of exploration.

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APPENDIX A

First Kiss Videos

Location of Video	Number of Couples	Video Title
Berkeley, USA	12	First Kiss at Berkeley
Boston, USA	16	First Kiss: Emerson College Edition
Coral Gables, USA	3	First Kiss AUC Edition
Durham, USA	12	Duke University's 'First Kiss'
Evanston, USA	14	Northwestern's First Kiss
Fresno, USA	9	Edison High First Kiss
Los Angelos, USA	10	WREN Presents: First Kiss
New York, USA	16	First Kiss NYC
Oakville, USA	9	First Kiss Students Edition: Sheridan College
Philadelphia, USA	7	First Kiss: UPenn Edition
Santa Barbara, USA	8	First Kiss – Real Life Edition
Tallahassee, USA	5	First Kiss: HBCU Edition
Winston-Salem, USA	8	First Kiss: Wake Forest Edition
Saskatoon, CA	10	First Kiss: YXE
Bristol, UK	9	Kissing Strangers: Bristol University
London, UK	9	First Kiss: The Dating Experiment
Caserta, IT	6	IL PRIMO BACIO (FIRST KISS Italy)
Torino, IT	9	First Kiss: Real Life Edition Italia
Utrecht, NL	5	First Kiss: Utrecht Edition
Cologne, DE	32	First Kiss Cologne
Moscow, RU	5	First Kiss in Moscow
Perm, RU	6	Поцелуй с незнакомцем PERMM
Yekaterinburg, RU	10	Поцелуй незнакомца (A kiss of a stranger)